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ABSTRACT

This book explores a range of conceptual, methodological, and empirical issues concerned with the application of needs-based resource allocation in education via formula funding of schools. The notion of "needs-based formula funding" employed in this discussion refers to the impartial application of an agreed set of explicit rules to allocate educational resources in a manner that ensures that schools receive what they need to deliver a prespecified quality of education. The book is presented in three main parts: the policy context for needs-based formula funding, technical matters related to the construction of funding formulae, and case studies in five countries. The conclusion offers a checklist for senior decision makers in Ministries of Education that highlights the preconditions for undertaking a successful implementation of needs-based formula funding. The book's main message is that needs-based formula funding of schools offers considerable benefits to both centralized and decentralized school systems in terms of increased levels of equity, efficiency, effectiveness, transparency, and accountability. (DFR)

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NEEDS-BASED RESOURCE ALLOCATION IN EDUCATION

VIA FORMULA FUNDING OF SCHOOLS

Edited by
Kenneth N. Ross
Rosalind Levačić

EA 030628

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via formula funding of schools

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Contents

	About the authors	x
Chapter 1	Introduction *by K.N. Ross; J. Hallak*	1
	IIEP's research and training programme in educational finance	1
	The need for the book	3
	The preparation of the book	5
	References	6
Part I	**Policy context and basic principles**	
Chapter 2	The role of formula funding of schools in different educational policy contexts *by B.J. Caldwell; R. Levačić; K.N. Ross*	9
	Introduction to main themes	9
	The structure of the book	11
	A framework for the analysis of policy associated with needs-based funding	12
	Equality and fraternity	15
	Liberty and choice	16
	Efficiency	17
	Economic growth and productivity	18
	The ascendancy of all five values	19
	Phases in the evolution of formula funding	20
	References	23
Chapter 3	Principles for designing needs-based school funding formulae *by R. Levačić; K.N. Ross*	25
	Introduction	25
	Formula funding as an integral part of educational policy	27

	The three main policy functions of formula funding	29
	A funding formula as a contract	32
	Criteria for assessing a funding formula	33
	The design structure of a funding formula	36
	What level of resources should be allocated to schools via a funding formula?	36
	What separate components should be addressed by a funding formula?	38
	The four main components of a funding formula	39
	Relating components to functions	42
	Dimensions of the components	42
	Indicators of the dimensions	44
	Coefficients attached to the indicators	47
	Hypothetical examples of funding formulae applied to individual schools	49
	Conclusion	52
	Appendix on terms	53
	References	55
Part II	**The four main components of formula funding**	
Chapter 4	Component 1: Basic student allocation *by I. Abu-Duhou; P. Downes; R. Levačić*	59
	Introduction	59
	Definition of activity-led funding	60
	Historical development of activity-led funding	62
	Two case studies: Victoria, Australia and Cambridgeshire, United Kingdom	63
	Case study 1: Activity-led funding analysis based on 'actual practice' in the schools of Victoria, Australia	64
	An example from Victoria	73
	Case study 2: Activity-led funding analysis based on 'desired practice' in the schools of Cambridgeshire, United Kingdom	76
	The activity-led staffing project	76

	Producing the model and the parameters	78
	Converting the time requirements into teachers	81
	Converting the teacher requirements into cash figures	82
	Target and best-fit parameters	82
	Further work	87
	Conclusion	88
	References	90
Chapter 5	Component 3: Student supplementary educational needs *by P.W. Hill; K.N. Ross*	91
	Introduction	91
	The rationale for supplementary educational needs funding	91
	Some historical antecedents of formula funding	96
	Classifying and evaluating resource allocation methods	99
	Dimensions of supplementary educational needs funding formulae	100
	Issues to be addressed prior to indicator construction	102
	Constructing indicators of student supplementary educational need	107
	Conclusion	112
	References	116
Chapter 6	Component 2: Curriculum enhancement and Component 4: School site needs *by P. Downes; S. Forster*	120
	Introduction	120
	Component 2: Curriculum enhancement	121
	Component 4: School site needs	123
	Conclusion	135
	References	136

Part III **Case studies in the application of formula funding**

Chapter 7 Case study 1: Formula funding of schools in Australia
by B.J. Caldwell; P.W. Hill 139

The origins of formula funding 139
Expenditure on education 139
Allocation of resources to schools 139
Emergence of a variety of needs-based funding mechanisms 140
Formula funding of schools as the centrepiece of school management reform in the government schools of the State of Victoria 143
The design of the funding formula 147
Current status of needs-based formula funding in Victoria 152
A short evaluative comment on Schools of the Future 152
Evaluation of formula funding in Victoria, Australia 155
Conclusion 158
References 158

Chapter 8 Case study 2: Formula funding of schools in England and Wales
by R. Levačić 161

The origins of formula funding 161
Policy context for formula funding 163
Criteria: government objectives for formula funding 165
School budgets: centralized and delegated portions 167
Financial regulations with respect to school budgets 172
The design of the funding formula 174
Transitional adjustments to funding formulae 185
An overview of the components 185
A brief evaluation of the English formulae against the assessment criteria 186

	The division between central retentions and the delegated schools budgets	186
	The schools' budget share	187
	Conclusion	192
	References	195
Chapter 9	Case study 3: Formula funding of schools in the United States of America and Canada *by A. Odden*	198
	The origins of formula funding	198
	Local policy context for formula funding	200
	School budgets: centralized and delegated portions	202
	The design of the funding formula	205
	Assessment and analysis	222
	Conclusion	225
	References	226
Chapter 10	Case study 4: Formula funding of schools in New Zealand *by N. Pole*	228
	The origins of formula funding	228
	School budgets: centralized and delegated portions	229
	The design of the funding formula	231
	Evaluation	244
	Conclusion	246
	References	247
Chapter 11	Conclusion *by K.N. Ross; R. Levačić*	250
	Towards implementation of formula funding: a checklist for school systems	251
	A concluding comment	256

10

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Chapter 1

Introduction

Kenneth N. Ross and Jacques Hallak

IIEP's research and training programme in educational finance

Since its establishment in 1963 the International Institute for Educational Planning has been working actively on research and training activities concerned with strategies for costing, financing, and budgeting in education systems. The focus for this work has been on mapping changes in the research environment for these three areas, and also on improving the related conceptual knowledge and data collection methodologies of educational planners – particularly those from developing countries.

In the 1960s the IIEP's main research efforts in the general area of educational finance were focussed on data collections designed to produce cost estimates that could subsequently be used to generate realistic prospective plans for the financing of evolving systems of education. These data were initially gathered from educational budgets, rather than being generated from actual expenditures. Later research at the IIEP broadened the sources of cost information and explored the use of financial projections as an important tool for educational planners who were responsible for mapping the macro development of whole systems of education.

In 1968 the first Director of the IIEP, Phillip Coombs, published a book entitled *The World Educational Crisis* which documented the difficulties being faced by developing countries as they sought to use their limited financial resources to manage rapidly growing demands for education from burgeoning populations. Coombs applied analytic and diagnostic methods to identify emerging global challenges for education and suggested priorities for dealing with them.

In a later 1972 publication Coombs worked with Jacques Hallak, the current Director of the IIEP, to draw together lessons from cost and finance studies that had been conducted by IIEP staff members in 27 education systems. The report on this work, *Managing Educational Costs*, synthesized available knowledge on educational finance and then applied this to analyze trends in educational costs and their relationships with educational development factors. The authors presented a strong case for educational planners to apply more innovative approaches to educational budgeting that would include cost-effectiveness and cost-benefit analyses.

Throughout the late 1960s and 1970s the world's educational planners had their attention firmly concentrated on the expansion of educational provision. Their work in the field of educational finance was mostly concerned with financial feasibility testing for the kinds of projects, plans, and programmes that would assist them to manage this expansion.

During the 1970s, under the leadership of the then Director of the IIEP, Raymond Poignant, a series of national case studies and monographs were produced covering a broad spectrum of experiences in the field of educational finance. These studies examined the financial challenges that faced education systems in developing countries, and also included analyses of the diversification of financial sources, cost recovery models, financial incentives, and student loan systems. The main aim of this work was to explore strategies that could be used by governments to achieve a more balanced long-term development of education systems.

As the 1980s commenced, the focus of educational planning efforts changed in a dramatic fashion. In many developing countries, especially in sub-Saharan Africa, the economic situation reached crisis point as governments struggled to reduce levels of national debt by introducing harsh policies that included major cuts in public expenditure and national consumption. These austere conditions often resulted in a major limitation in the resources that were available for education.

Whereas the educational planners of the 1960s and 1970s were planning for growth, many of their counterparts in the 1980s were planning for cutbacks in expenditure and the inevitable impact that this would have upon providing resources needed to enhance the quality of education. By the end of the 1980s an era of harsh structural adjustment had commenced in many countries and the dominant economic discourse concerning educational provision was mostly centred around issues of financial crisis. At the IIEP these years saw the emergence of new areas of interest in the field of educational finance that were concerned with cost saving, budgetary cuts, and the mobilization of local and private resources for education.

The IIEP's celebration of its 25th anniversary in 1988 gave cause to look back on the Institute's accomplishments in the field of educational finance – but also ushered in a new agenda of research and training concerns for the 1990s. A broader approach to issues related to educational finance emerged, with these issues being studied across a spectrum of educational planning areas, rather than being treated as discrete and separate concerns.

The IIEP's research into finance, costs, and budgeting during the 1990s was conducted under the leadership of Serge Péano, and was directed towards the development and modernization of educational

financing systems in developing countries – with an emphasis on the use of information systems containing a comprehensive mixture of budgetary, accounting, and statistical information. This work was expanded and strengthened through productive working arrangements with two consortia of ministries of education located in Anglophone Southern Africa and Francophone West Africa.

As the year 2000 approaches, the IIEP's research and training programmes have settled on four main areas: improving the quality of basic education, secondary education policies and strategies, education for disadvantaged groups, and educational management and financing. Issues of educational finance, costs, and budgeting have been embedded within each of these areas and often integrated with research designs for specific projects with a view to generating more holistic views of the field of educational planning.

This book exemplifies the IIEP's broadened view of educational planning. It commences with an analysis of central issues in school finance by exploring the fundamental value systems that underpin modern societies and their education systems, and then proceeds to a pragmatic analysis of the concept of needs-based formula funding that refines and unifies the terminology used to describe this initiative in different school systems. Finally, the book takes up a discussion of the most important technical matters related to formula construction, and then illustrates this discussion through a series of detailed case studies drawn from five countries.

The need for the book

The use of formula funding to determine resource allocations in school systems is not a new concept. Many ministries of education around the world have, at least, a simple 'in kind' formula funding system in place which employs student/teacher ratios to guide staffing decisions. Some school systems provide certain schools with various supplementary resources when these schools are designated as serving poor or disadvantaged communities according to certain indicators of 'poverty' or 'socio-economic disadvantage'. Other school systems take the physical location of schools into consideration and then provide extra staff or allowances to the most isolated schools. Still other school systems make provision for schools charged with the responsibility of offering special programmes (such as music or vocational programmes) or specialist subject offerings (such as minority languages or advanced laboratory science).

In some cases the formulae developed for these resource allocation mechanisms are fairly complex. Examples of these are to be found in the various measures of poverty and socio-economic disadvantage that have been used for the Title I programme in the

United States, the Educational Priority Areas programme in the United Kingdom, and the Disadvantaged Schools Project in Australia. These formulae have employed detailed social indicators based on income, education, occupational status, language spoken in the home, and ethnicity.

Most of the early attempts at needs-based resource allocation using formula funding of schools have been programme specific, usually targeted at special sub-groups of schools, and almost always linked with a relatively small proportion of the total budget that was available for schools. Different formulae were usually used for different programmes – which sometimes led to a confusing array of resource allocation activities running in parallel without co-ordination of delivery or impact.

Major advances in the conceptual and methodological aspects of needs-based formula funding in education emerged in the 1990s, when school systems in countries such as Australia, Canada, New Zealand, United Kingdom and USA, started to implement radically decentralized approaches to educational administration. These school systems began to employ school-based management models in which the majority, sometimes over 80 percent, of a school system's available educational resources were placed under the direct control of schools. The arrival of these models generated a very strong demand for formula funding because this was seen as the only way in which to establish valid and defensible methods for making decisions about exactly how much each school would receive from a total school system budget.

The needs-based formula funding approaches that have emerged in the late 1990s do not represent minor enhancements to the field of educational funding. Instead, they signify a quantum leap in efforts to establish system-wide school finance models that are integrated with agreed educational values and policy, grounded in available research, and accessible to all stakeholders. **There are three main reasons why all educational planners should begin to understand more about this extremely important trend.**

Coverage, impact, and focus: Unlike the earlier applications of funding formulae described above, the new applications of needs-based formula funding represent an unprecedented break with traditional patterns of resource allocation in education. In particular, these approaches (a) cover all schools in a school system (rather than seeking to identify sub-groups for differential treatment), (b) are used to allocate most of a school system's resources (rather than just a few resource fragments linked to particular programmes), and (c) focus on a genuine attempt to satisfy agreed educational needs (rather than ignoring those characteristics of students, school programmes, and school sites that generate genuine differential costs).

This massive change in the coverage, impact, and focus of educational finance strategies has started to shake the foundations of educational planning offices around the world.

Research foundations: The major financial impacts that can arise from the adoption of needs-based formula funding approaches have generated enormous pressures to construct and apply funding formulae in an impartial manner that is based on a research-based assessment of educational needs. This has made it possible for school systems to remove three undesirable, but often widespread, influences on resource allocations: historical (but often illogical) precedents in resource levels for particular schools, bidding and bargaining by the more entrepreneurial school heads on behalf of their own schools, and the personal opinions and preferences of school system administrators. Further, the central position of research knowledge in guiding the construction of funding formulae has had the beneficial result of highlighting the importance of sound educational policy research as a basis for informed school finance decisions.

Catalytic effect upon educational debate: Differences in needs-based formula funding outcomes for different schools must always be justified at all levels of an education system. This requirement implies that the implementation of formula funding should be a transparent and intelligible process that permits all stakeholders in the education process to enter the school finance debate, to view and use relevant information, and to feel comfortable with the fairness of the resulting resource allocations. All of these outcomes are highly desirable in any society because they establish the kind of environment in which school finance decisions can be based on informed, continuing, and widespread debate.

These three reasons for the importance of needs-based formula funding have been taken up in this book in a manner that integrates them with policy, technical, and implementation issues. This structure was adopted by the authors with the aim of providing sufficient information to enable senior decision-makers within ministries of education to explore the policy contexts and basic principles related to this emerging trend (see *Part I* of the book), and, at the same time, to provide educational planners with sufficient technical background and implementation examples to be able to commence the process of designing and implementing needs-based funding formulae (see *Part II* and *Part III* of the book).

The preparation of the book

The overall concept for this book was generated out of many discussions among IIEP staff members concerning emerging trends

in educational planning and their implications for future research and training programmes conducted by the IIEP. On the basis of these discussions it was decided that the IIEP should prepare a book on the topic of *Needs-Based Resource Allocation in Education via Formula Funding of Schools*. As a first step, an initial chapter framework was prepared and sent for review to several members of the IIEP's Council of Consultant Fellows. This document was finalized following further review by a number of experts selected from the fields of educational management, school finance, and statistical methodology.

For each chapter of the book one or more specialist authors were identified. These people were selected according to two criteria: their leadership role in the field of needs-based formula funding, and their 'hands-on' experience in the production and implementation of funding formulae. The authors prepared their contributions in accordance with the chapter framework and then met at the Paris offices of the IIEP in late 1997 to examine what had been written, to debate conceptual issues, and to reach consensus on a unified structure and style for the book. Throughout 1998 chapter revisions continued via the Internet until the book was completed in early 1999. The Director and staff of the IIEP would like to congratulate all of the authors for their excellent contributions to the book and also for the manner in which they worked as a team on their own chapters and on the refining of work prepared by others.

The publication of this book marks a point in time where the implementation of various forms of needs-based formula funding has precipitated great changes in the field of school finance. These changes have implications for all educational planners because they represent a fundamental shift in the philosophical and empirical bases for funding whole school systems. Charting the future evolution of needs-based formula funding will be an exciting and demanding task – and it will need to extend for at least another decade before its full impact is known and evaluated. This book is therefore offered to the educational planning profession as an initial statement on needs-based formula funding – with the hope that it will both inform and provoke further investigations and debates.

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Part I
Policy context and basic principles

Chapter 2

The role of formula funding of schools in different educational policy contexts

Brian J. Caldwell, Rosalind Levačić and Kenneth N. Ross

Introduction to main themes

Formula funding for schools has been a feature of educational management since the formation of systems of public education. By a funding formula we mean an agreed set of criteria for allocating resources to schools which are impartially applied to each school. At the most basic level, teachers have been assigned to schools according to a centrally determined entitlement based on the number of students and assumptions about class sizes considered necessary or feasible. Similarly formulae have been used with respect to supplies and equipment. With the passage of time, several formulae were established for different types of school and for different kinds of educational programme. With the recognition in the 1960s of the relationship between economic disadvantage and poor educational attainment, policies to provide additional resources for schools with particularly large concentrations of disadvantaged students were introduced, for example in the USA, Australia, Britain, and France. Funding formulae using various indices of economic and social disadvantage were developed in order to allocate additional resources to schools serving disadvantaged communities. Consequently even more complexity was added to approaches to resource allocation. Usually additional resources were supplied in kind (that is, additional teachers or auxiliary staff, equipment, and materials). If additional money was provided, it was as an earmarked allocation, so that the matter of virement or transfer across different categories of resources was generally not an issue. Although the focus in these early formulae was on the student, class, or school, these developments generally occurred in systems of public education that were centralized in respect to the locus of decision-making on most matters of importance.

The most sophisticated approaches to formula funding to date have been associated with recent efforts to reform public education in a number of countries, especially where that reform involves a significant level of decentralization of authority, responsibility, and

accountability to schools within a centrally determined framework of policies, priorities, and standards. If resources were to be allocated directly to schools as one line or lump sum budgets for local decision-making, then governments and their agencies were confronted with questions such as 'What amount should be allocated to each school?' and 'What factors should be taken into account in determining the level of resources that should be allocated to a particular school?' These questions raised others, especially when it became evident that existing approaches to resource allocation were unclear or inconsistent, or in some instances, open to manipulability on the basis of special pleading or political interference. Fair and transparent approaches were demanded and needs-based funding formulae (that is, formulae. derived from an explicit analysis of what schools need to spend in order to provide a specified quality of education for all their students) were developed accordingly. Since matters related to the quality of schooling for all students were at centre stage, the formulae were more complex than ever before because they needed to be sensitive to the resource requirements for the full, or a more complete, range of learning needs. However, not all school funding formulae developed in these reformed systems were fully needs-based. In England, for example, new funding formulae were developed which often tended to reflect past resource allocation practices rather than the costs of delivering the new national curriculum.

Simply because contemporary and relatively sophisticated approaches to needs-based funding have emerged under conditions of decentralization does not mean that this should always be the case or that systems that are relatively centralized should have no interest in the matter. While these advances occurred because of needs that arose from a decision to decentralise, the same reasons and the same questions ought to shape approaches to resource allocation in any system of public education, even the most centralized.

This book is based on the premise that there are advantages to formula funding which can be exploited within a wide range of differing education policy contexts. This argument is deployed later in this chapter to demonstrate the role of formula funding within different education policy environments that are characterized by different emphases given to key values in education policy. This analysis underpins the rest of the book, which is divided into three parts. The first part is concerned with the principles of developing and constructing needs-based funding formulae, the second with a detailed analysis of technical issues, and the third with case studies of school funding formulae in practice.

The structure of the book

A framework of principles is set out in *Chapter 3*, which emphasizes that a needs-based funding formula is an instrument of education policy and should therefore be devised so as to be consistent with the policy objectives set for the school system. In *Chapter 3*, four components of a funding formula are distinguished. These are:

(a) the basic student allocation;
(b) curriculum enhancement;
(c) student supplementary educational needs; and
(d) school site needs.

Then *Chapters 4* to *6* further develop each component of the formula: *Chapter 4* covers activity-led funding for deriving the basic pupil allocation, *Chapter 5* examines formulae for allocating supplementary resources for supporting pupils with a wide range of special educational needs arising from factors such as disability, learning impairment, lack of fluency in the language of instruction, and economic disadvantage. This chapter shows how earlier formulae for allocating additional resources for supplementary educational needs have been grafted onto the more sophisticated formulae arising from policies of decentralization. *Chapter 6* discusses how methods for allocating resources to take account of differential per pupil costs due to curriculum enhancements and the specific characteristics of the school site.

It was noted at the outset that decentralization of school management has been the policy context for recent developments in the most sophisticated needs-based school funding formula. This is why the case studies of school funding formulae have been selected from Australia, New Zealand, North America and the United Kingdom. A particular feature of these reforms is that they included the introduction of a greater degree of choice of school by parents with the funding following the student to the chosen school. They have also included (to varying degrees) decentralization of management decision-making about resource deployment to school level. These aspects of decentralization have often been accompanied by centralizing features in which the government and/or education authority sets a framework of priorities and standards within which schools are expected to operate and against which they are held accountable. In particular, needs-based formula funding, resource management at school level, and a framework of explicit school outcome standards, have together led to increasing emphasis on the ways in which schools

can deploy their available resources in order to maximise learning outcomes for their students.

It is therefore pertinent to examine the school reform movement involving decentralized school management and needs-based funding formulae – which emerges as an essential constituent of these reforms. The Case Study *Chapters 7* to *10* explore a range of issues that include the values underpinning and the forces driving the school reform movement, especially those that entail school-based management or self-management, as it is variously known.

From the case studies of recent developments in needs-based formula funding of schools, *Chapter 11* (Conclusion) draws out the key lessons to be learned, and then sets forward an agenda of six factors which facilitate the implementation of needs-based formula funding.

A framework for the analysis of policy associated with needs-based funding

The role of formula funding of schools in a variety of education policy contexts can be demonstrated using Swanson and King's (1991) framework of values for the analysis of reform in education.

> *"Five values or objects of policy that have been historically prominent in shaping Western societies and are also particularly relevant to making decisions about the provision and consumption of educational services are liberty, equality, fraternity, efficiency, and economic growth. Each has experienced ascendance and descendance in priority with changing societal circumstances, but none has ever lost its relevance entirely. The current shift in priorities placed on these five values underlies much of the controversy surrounding education today" (Swanson and King, 1991, pp. 22-3).*

Liberty is a classic value but it is manifested in different ways with different language. Within the state sector school choice and diversity of school type and education programme are manifestations of the principle of liberty. Choice and diversity can be advocated for their own intrinsic value as promoting liberty of the individual when consuming a state provided service. They have also been advocated as providing incentives for producers to raise the quality of their output.

Equality is also a classic value which in its most fundamental sense is intended to convey an intention for all people to be treated equally. Horizontal equity requires that students in a single school system should receive the same allocation of resources if they have similar learning needs, regardless of where they go to school. There

are still many school systems, in developing as well as developed countries, where there are local and regional disparities in funding which breach the principle of horizontal equity. Another equity principle is that of vertical equity. As different life circumstances of people have been recognized, so too has the view that treatments ought to be different if this value of equity is to be sustained. An example is the different educational programmes and the different costs associated with providing a school education to those with disabilities and impairments of one kind or another. To resource such students on the same basis as students without these conditions would manifestly violate the value of equality or equity if educational opportunity or even educational outcome is a primary consideration.

Fraternity is another long-standing value that has underpinned policy on public schooling. In some ways related to equality, it is manifested in education as an important characteristic of the public school. This is considered to be an institution that will meet the needs of all young people, regardless of socio-economic circumstances, religion, class, gender and the like. The value enters the domain of resources because different levels of resource may be required to ensure that adequate public schooling can be offered for particular mixes of these circumstances or conditions.

Liberty, equality, and fraternity are thus an enduring set of values that impact upon not only public policy but also the entire social and ethical fabric of some nations. The remaining values in the Swanson and King scheme – efficiency and economic growth – may seem out of place when listed with liberty, equality, and fraternity but it requires just a moment of reflection to see their relevance to policy analysis on the resourcing of public schools.

Efficiency is generally considered to be a value that takes account of inputs and outputs. For example, it is desirable to achieve the highest possible output for a given input, or a given output should be achieved with the lowest possible input. Such values are manifest in public policy when governments and their agencies are faced with the task of resourcing an increasing array of complex services in the face of limited or even declining resources. Effectiveness is accommodated in this view of efficiency, if the former is considered to be a measure of the extent to which explicit intentions (goals, aims, objectives, targets) are achieved.

Economic growth has also been evident as a value in public policy since it yields higher living standards including the revenues to resource public services. Stable or declining economic growth can place the provision of services in jeopardy. More broadly, however, the achievement of economic growth requires the citizens of a nation to have certain knowledge, skills, and attitudes. A particular feature of educational policies in the last twenty years is that education systems are seen as fundamental to sustaining and improving

the nation's international competitiveness. From this value perspective the purpose of the education system is to instil the knowledge, skills, and attitudes required for a highly productive and flexible work force able to engage in life-long learning. In pursuit of this value, governments are defining frameworks of educational standards against which students and schools are assessed and schools held accountable. The introduction of new programmes to improve the skills of the labour force, invariably means different patterns of resource use, including the need for additional expenditure on education in information and communication technology. Schools are being required to forge links with business, and to cease operating as cogs within a state bureaucracy and to become instead self-managing and to operate in a more business-like manner.

Chapter 3 provides a detailed explanation of the concepts of equity, efficiency, and effectiveness in the context of the construction of needs-based funding formulae. They become evaluation criteria for judging the worth of such formulae. Here, however, they are considered as values in the formation of public policy which have given rise to interest in needs-based funding formulae in the first place.

The five values in the Swanson and King schema provide a common framework in which different national education policy contexts can be analysed. At any one time different countries are likely to be giving different emphases to each of the particular values. Specific policies have a role to play with respect to one or more of the five values. In particular, needs-based formula funding has a part to play with respect to each of the five values. This analysis is encapsulated in *Figure 1*, which shows how specific educational

Figure 1. The role of needs-based formula funding in delivering the educational policy values

Policy values	Equality and Fraternity	Liberty and choice	Efficiency	Economic growth and productivity
Education policy strategies	Directing additional resources to enhance attainments of educationally disadvantaged.	School choice. Community involvement in school governance.	Decentralized management: local decision-making on resource deployment and links to learning outcomes.	Framework of national educational standards. Accountability of schools for achieving expected standards.

policies can be analysed as addressing particular values. To make the framework simpler, equality and fraternity are collapsed into one value. Below, we take each policy value and relate it to the types of education policy currently in use which promote this value and the role of needs-based formula funding in delivering it.

Equality and fraternity

The values of equality and fraternity were in ascendance in the 1960s and 1970s in many countries through policies intended to counteract social and economic disadvantage by redistributing educational resources. Funding formulae were developed in order to allocate additional resources to schools serving educationally disadvantaged students. The early 1980s marked the emergence of new approaches to allocating resources in systems of public education based on a determination of the characteristics of students and assumptions that different patterns of resources were required for different categories of student need.

Contemporary approaches considered in this book date from this time. They are effectively illustrated by the work in Australia of Kenneth Ross and his colleagues at the Australian Council for Educational Research and various education departments of state systems. An index of educational need based on census data was developed from measures on selected indicators, providing essentially a measure of socio-economic circumstance of students that correlated with measures of achievement. The index was derived from a composite of data from students, enabling schools to be placed on a 16 point scale that became the basis for allocating resources to schools to cover various categories of expense. This became known as the Ross Index and it is still widely used in most Australian states, and in some systems of non-government schools, as well as in New Zealand.

This index reflected needs and values that gained ascendancy in most western nations in the late 1960s and throughout the 1970s. These were the years in which traditional bases of authority were challenged and the needs of the disadvantaged were being recognized in public policy in each of the nations that provide case studies in this book. In Australia, this period in school education was marked by the creation of the Australian Schools Commission in 1973 that dispensed Commonwealth (national) funds to states (public sector) and schools (private sector) for the next fifteen years. Most grants were focused on the needs of particular students, especially where it was perceived that some disadvantage should be redressed. Programmes with titles such as the Disadvantaged Schools Programme, and the Country Areas Programme were born. In

systems of public education, these funds were frequently distributed by central fiat on the basis of submissions from schools. In other cases, notably Tasmania, dating from 1976, the funds were decentralized directly to schools according to formula. In time, the decentralized approach became the norm, and the Ross Index proved a valuable guide.

Needs-based resourcing in the United States under Title I at the federal level reflect the same values of equality and fraternity. This programme began in 1965 and continues, with a range of approaches to accessing the funds. Some call for tight control by central authorities in school districts; others have incorporated such funds in formulae for a more decentralized approach in schemes of school-based management. Similarly, the United Kingdom and France developed additional funding for schools in educational priority zones. This approach still exists in France.

These schemes were driven by the values of equality and fraternity. However, more recently, other values in public policy have moved to centre stage and these are briefly considered in the following discussion.

Liberty and choice

Recent approaches to school reform in the nations selected for case studies have involved a high level of local management or school-based management or self-management, as it is variously known. In each instance, formula funding has been adopted to determine the total amount of resources that will be decentralized to each school for local decision-making in a system of public education. The values of liberty and efficiency appear to be at the fore in shaping public policy in these developments. The value of liberty is manifest in policy on choice, reflecting a view that there ought to be more choice among schools for parents and students than there has been in the past. Choice implies differences a far as educational programmes are concerned. These may be perceived differences in quality for programmes of similar content, or diversity in programme aims and content.

These differences thus raise the matter of how resources ought to be allocated to schools since different programmes mean different patterns of resources. Valuing liberty in this sense may be at the expense of equality and fraternity if these latter values are construed as uniformity or sameness. On the other hand, equality and fraternity may call for different patterns of funding if they mean fairness or an entitlement to resources that match needs. The exercise of choice may also challenge the values of equality and fraternity if it results in some schools being denuded of students across the socio-

economic or achievement spectrum. Public schools reflecting a value of fraternity ought to have students across these spectra. This conflict in values does not relate at first sight to policies of needs-based funding or decentralization; it could occur in centralized of systems where children are required to attend their neighbourhood school but social groups are geographically segregated. However this conflict of values is more evident when funds follow the student which is a feature of systems that have adopted the needs-based funding approach under conditions of decentralization.

Liberty and choice have also been interpreted not just as consumer choice but as also as enabling the consumer of education to influence schools through participating in their management. A notable feature of the reform movement is the involvement of parents, and other local community representatives and even older students, in the management of schools by locally elected or appointed school councils. These developments also raise the issue of enhancing the role of school councils by extending their management responsibilities, including the management of resources. Needs-based formula funding then provides the means for allocating resources to school councils to manage.

Efficiency

Along with liberty, the values of efficiency and economic growth appear to be in ascendance at this time, especially in the nations selected for case studies in this book. The movement known as 're-inventing government' (based on Osborne and Gaebler, 1993), with its emphasis on leaner, more focused but still powerful government and agencies of government, and operational units armed with authority, responsibility and a higher level of accountability, is driven by a need to achieve a higher level of efficiency in the delivery of public services, including school education. Efficiency here is assumed to include effectiveness. Achieving a tighter connection between patterns of resource allocation, learning needs, and student outcomes may be viewed as part of a drive for efficiency. A major reform in trying to achieve this has been decentralized, local, or school-based management, whereby schools are given a one line or lump-sum budget which they can spend as they determine for the purposes of educating their pupils. Needs-based formula funding of schools provides a rational and equitable means of determining the lump-sum budgets for schools in a decentralized system. The evidence indicates that decentralized school management has improved the efficiency with which schools utilise resources, in the sense that a given output can be achieved at lower cost.

Economic growth and productivity

The reform movement in school education is also a feature of efforts in many nations to achieve higher levels of economic growth in an era where success in a global market is necessary for national well-being. This value accounts for the recent movement towards centrally-determined curriculum and standards frameworks, and shifts in authority, responsibility and accountability to the levels where direct action is required, namely, the school and the classroom, if different or improved outcomes are to be achieved. Resourcing schools for this improvement effort is thus an important issue. More specifically, however, this value has underpinned new complexities in needs-based funding, for many changes in curriculum, for example, have involved additional costs for schools, especially where information technology is concerned and where new languages have been added.

Much intellectual capital, time, and effort has been devoted to determining funding formulae for allocating lump sum budgets to schools which reflect various mixes of learning needs and different variables that describe the nature and location of the school. There is an underlying assumption that schools have the capacity to plan the deployment of these resources and engage in appropriate activities in learning and teaching that optimise outcomes for students, within their budget constraints. Whether such a link between inputs, processes, and outcomes has been achieved in these school systems is an empirical issue. Has value been added to the quality of learning because of a shift to needs-based formula funding? The research record in this respect is modest at best and it is only in very recent times that tentative evidence has been found that schools can indeed use a local capacity for decision-making to improve learning outcomes for students. A subsidiary issue for policy-makers at the system and school levels is thus how to make explicit, and make effective, the direct and indirect links between resource and outcomes.

A major problem is that several decades of research into school production functions (Hanushek, 1997) have not resulted in discovering clear links between the observable quantity of resources deployed by schools and consequent learning outcomes. This can be attributed to the importance of the quality of the interaction between teachers and students in determining learning outcomes, differences in which are not reflected in differences in cost per student or in physical amounts of resource per student. Consequently there is an absence of information from education production functions which educational planners could use for the purpose of allocating resources to schooling. The clearest guidance research has offered currently

to policy-makers is the value of smaller sized classes for enhancing the learning of young children (Hanushek, 1998).

School-based management of resources, within a framework of standards which provides schools with good quality information on the outcomes of their programmes of teaching and learning, offers the possibility of practitioners building up their own knowledge base of links between inputs, processes and outcomes, assisted by government or education authority support in the creation and interpretation of this information. However, such an approach still requires school managers to have the capacity to acquire, and make appropriate use of in their decision-making, knowledge about the links between resource deployment and learning outcomes.

The ascendancy of all five values

Taken together, the three values of liberty (choice), efficiency (incorporating effectiveness) and economic growth (productivity) have gained ascendancy in more recent approaches to needs-based funding. Even so, as the case studies in this book show, the new funding formulae developed in these policy contexts have incorporated earlier work on formulae for allocating resources for supplementary educational needs, which are underpinned by the values of equality and fraternity. Indeed, it may be expected that the values of equality and fraternity, eclipsed recently in some respects, may emerge again as concerns build that the needs of some students have not been met or that some schools funded according to a contemporary needs-based approach have not proved effective in addressing needs.

It can therefore be argued that education policy-makers and school personnel are facing particularly strong pressures arising from demands that all five values be addressed simultaneously. Needs-based funding by formula provides the means by which each of the values can be addressed.

- Equality and fraternity can be addressed through directing additional resources according to the learning needs of particular pupils or schools serving disadvantaged communities. The greater the variance in the educational attainment of pupils between schools compared to the variance in attainment within schools, the stronger is the case for differential funding of schools. The variance in attainment between schools is especially large in many developing countries, and therefore needs-based formula funding could contribute significantly to furthering equality of educational opportunity. This use of needs-based

funding formulae can be undertaken equally well in centralized school systems as in a decentralized ones.

- School choice requires a funding regime where resources follow the pupil, which a needs-based funding formula will provide without necessarily requiring devolved management of lump sum budgets.
- Efficiency has been successfully addressed in a number of systems through delegated management of budgets allocated via formula. Decentralized school management can also be used in conjunction with incentives for schools to raise funds from parents and sponsors, when the government is unable or unwilling to fund education sufficiently through the tax system.

More problematic and more untried as yet is the promotion of improved school outcomes through a framework of standards within which schools are free to determine resource deployment. However this is a logical development from an earlier focus of attention on inputs to a contemporary concern with schools' educational outputs. As Ross and Mählck (1990) observed in an earlier IIEP publication on *Planning the quality of education:*

> *"decision-makers in the 1990s will demand that proposals for change put forward by educational planners should have a reasonable chance of resulting in improved educational outcomes and/or improved student flows, and that these improvements should be of a magnitude that can be defended in terms of the costs of making these changes" (p. 11).*

Phases in the evolution of formula funding

First generation funding formulae

The state-of-the-art needs-based school funding formulae presented in this book have developed out of earlier, cruder, partial funding formulae. The first generation of funding formulae were simple pupil/teacher and staffing ratios and small per pupil allowances for consumable items. These formulae assumed that all pupils at a given grade level in a school have the same educational needs and hence cost the same to educate. Adoption of these features of first generation funding formula ensure horizontal equity in the allocation of resources to schools and could be usefully applied in centralized school systems and in developing countries.

Second generation funding formulae

The second generation of funding formulae were developed precisely in order to take account of differences in learning needs of students which mean that some students cost more to educate than others. These funding formulae, such as the Ross Index in Australia, are indices made up from variables which reflect characteristics, such as economic disadvantage or lack of fluency in the language of instruction, which correlate well with students' levels of educational attainment. The additional money per student delivered by these second generation formulae for supplementary educational need was not based on an any analysis of the costs of educating students with particular learning needs to given levels of attainment. The formulae were used to distribute a politically determined sum of money to schools according to their concentration of educationally disadvantaged students. These second generation formulae have now been adapted and incorporated into the more comprehensive third generation formulae, examples of which are presented in the case studies in this book. This feature is readily capable of adoption and use in either decentralized or centralized school systems.

Third generation funding formulae

A 'best practice' third generation needs-based funding formula has the following characteristics

- Comprehensiveness: it includes all the costs of educating students which are incurred at school level.
- Cost-based: the formula is derived from an analysis of the costs of providing students with a specified educational programme, differentiated according to students' supplementary educational needs and the specific costs of the school they attend.
- Incentive appropriate: the formula encourages schools to act in ways which are consistent with agreed educational policy objectives.

The techniques for constructing third generation funding formulae are set out in *Chapters 4, 5* and *6* of this book, and the case studies of practice in *Chapters 7, 8, 9* and *10*. It should be noted that not all aspects of the case-study examples of third generation formulae fully accord with the three characteristics set out above. Not all the formulae cover all educational costs, are fully based on an explicit analysis of per pupil costs, or include only appropriate incentives. This is because the funding of schools is not only a rational

technical exercise, but also a political process. Educational costs are not always an objective phenomenon but are subjectively determined. Specifying both the quality of state funded education and how much society is willing to pay for the collective provision of education through the tax system is a political process. The nature of education as a private and social good also makes it difficult to specify clearly or to cost accurately. This is because the desired outcomes of education are multiple, contested, and frequently intangible.

Towards fourth generation funding formulae

However, despite these considerations, the adoption of needs-based formula funding can make considerable improvements relative to alternative methods of resource allocation to schools. The potential benefits of needs-based formula funding are discussed in detail in *Chapter 3*. They include improved equity, by ensuring that like students and like schools are funded the same amount while those which justifiably incur higher costs are funded accordingly. Formulae are also more transparent because funding decisions are subject to external scrutiny and so inequity and inefficiency can be challenged. Funding formulae provide much better efficiency incentives to schools than historic funding. A needs-based funding formula must be based, by definition, on an analysis of what the funding agency considers the costs per pupil, differentiated by educational need, should be within the budget constraint set. Once the assumptions about the quality of education programmes expected from schools and the costs of the resources being provided to schools are clear and transparent, a well informed dialogue can then occur between educationists pressing for more resources and the funders (government agencies as representatives of tax payers) about the appropriate links between learning outcomes and resource inputs. The actual costs of education are a product of the interaction between the overall education budget constraint and the educational processes that link resource inputs to learning outcomes. To improve the efficiency and effectiveness of the education system, we need knowledge of per pupil costs per learning outcome, not simply overall cost per pupil, which is still input focused This is an ideal towards which fourth generation funding formulae can aim, given sufficiently good quality information about the links between resource costs and learning outcomes can be developed.

If we are to improve both the quality of educational programmes and the attainment of all students, then better quality information about the links between the costs of resources, the deployment of resources and learning outcomes for students is needed at both the level of educational policy-makers and planners and at the level of

the school and classroom. This knowledge has ultimately to be derived from information about the links between costs, processes, and learning outcomes in the classroom. Policy-makers and planners working in agencies above the level of the school cannot possibly possess the richness of information about local context which teachers possess. The key issue for improving educational outcomes via improved methods of allocating resources to schools, is for educational planners to have sufficiently good cost information to construct formulae that will allocate resources to schools in ways which encourage teachers to make the best use of their locally specific information. This is the rationale for school-based management within a needs-based formula funding regime which can link resource deployment to learning outcomes.

The extent of decentralization appropriate for achieving the preferred balance of the five key values for education policy depends, in particular, on the capacity of personnel at school level to take responsibility for decision-making and resulting action. Whatever the appropriate degree and form of decentralization, needs-based formula funding has the potential to deliver benefits. These benefits are greater where there is improved knowledge about the costs of education, and the links between resource and learning outcomes which are essential for improving the quality of education.

Existing centralized school systems can benefit from the adoption of needs-based formula funding, within existing centralized systems. In particular, the provision of greater equality of educational opportunity can be achieved by needs-based funding formulae which ensure horizontal equity in resource allocation and which take into account students' supplementary educational needs. Countries wishing to move towards formula funding in the future can benefit from the technical and practical knowledge that has already been gathered by school systems that have implemented needs-based formula funding of schools.

The aim of this book is to show how needs-based funding formulae can contribute to improving school systems and how needs-based funding formulae can be developed and constructed. This requires not only knowledge of the technical aspects of designing funding formulae, but also an understanding the role of a funding formula as an instrument of education policy and how it relates to the values underpinning that policy.

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Chapter 3

Principles for designing needs-based school funding formulae

Rosalind Levačić and Kenneth N. Ross

Introduction

The funding formulae examined in this book concentrate on those which allocate resources directly to schools from a funding agency. That is, formulae for allocating school finance between different levels of school administration (for example, regions, districts, etc.) have not been considered here. In the following discussion we refer to the allocator of the finance as the 'funding agency': this may be the central government ministry of education, or a state or local government unit administering schools, or a state funding agency set up for the purpose of allocating finance to schools. 'Funding agency' is an example of a term we have defined for this book, which aims to be applicable to all school systems. Each school system tends to have its own jargon and terminology, therefore we have made an attempt to develop a common set of terms – which have been listed in the appendix to this chapter.

The main distinguishing characteristic of a funding formula is that it consists of a set of agreed objective criteria which are impartially applied to each school. The United Kingdom government's definition of a funding formula is "methods, principles and rules of any description, however expressed. The formula does not have to be expressed in purely algebraic form, but it must apply a consistent set of criteria for distributing resources" (DES, 1988, 7/88 para. 103).

Resourcing schools by formula is therefore a different method to others which have been much more widely used in the past and continue to be used in many school systems. Three major alternative methods can be distinguished (Knight, 1993: pp. 61-67).

- Historic funding or incrementalism (Wildawsky, 1978) – the school receives funding for this year which is the same as it spent the previous year modified up or down by a few percentage points.
- Bidding – the school presents a case for funding based on known criteria and is awarded finance according to how well the funding agency considers the bid meets the criteria.

- Discretion – the school receives funding according to the opinions and judgements exercised by funding agency administrators.

Formula funding is not a suitable method for allocating all types of public expenditure on schools. For example, expenditures that have an uneven incidence over time, such as major capital projects, are not usually suited to allocation by formula. Therefore we have limited the scope of the expenditures considered with respect to formula funding to the annual flow of recurrent finance for a well established school system.

Needs-based formula funding is a specific approach to designing a funding formula so that the amount which is allocated to each school is directly derived from an analysis of what the school needs to spend in order to provide a specified quality of education for its students. This approach to funding requires (a) a prior specification of the kind of educational provision that schools are expected to provide for students with particular characteristics, and (b) a justification of why different forms of provision result in cost differentials. Thus needs-based formula funding relates the finance allocated to schools for their educational provision to approved differences in the characteristics of students, programmes of learning, and schools. Just dividing a given total school system budget evenly amongst all students is an administratively simple task – but would not represent a needs-based formula funding approach unless it had been agreed and demonstrated that all students in all schools had equal needs. Similarly, a funding approach that replicated a previous historic pattern of funding with respect to the different grade and/or age levels of students would also not be categorized as needs-based formula funding.

The focus of this book is on the distribution or allocation of a total education budget to schools and not on the generation of that total budget. Budget generation for systems of education refers to the political and administrative processes by which the total annual sum of money to be spent on schools is determined – and is usually the outcome of a process characterized by bargaining and negotiation between various government departments and the treasury (Wildawsky, 1978). While needs-based formula funding is primarily a method of budget distribution, it does have important implications for budget generation. If the budget generation process takes no account of the resourcing needs of education providers and their clients, then a needs-based method of distributing a total budget to schools will focus attention on the absence of a rational link between how the total budget is generated and what government policy expects schools to provide.

Recent developments and advances in formula funding of schools in a number of countries have been associated with a growing trend towards school-based management. However, funding formulae have a much longer history within more traditional school systems. In more centralized school systems resources are often allocated directly to schools in kind, and not in the form of money, by a central co-ordinating education authority. For example, it is very common in administratively centralized school systems for the education authority to determine the teaching staff establishment of each school by means of a formula which relates the number of teachers to a specified student/teacher ratio or to a specified teaching group size for designated subjects and grade levels.

Funding formulae were also developed in the late 1960s and 1970s in order to guide resource allocation decisions for educational programmes in the USA, (United States Department of Health, Education, and Welfare, 1976), France (Direction de l'Evaluation et de la Prospective, 1993), the United Kingdom (Plowden Report, 1967), and Australia (Ross, 1983). These programmes were designed to allocate additional resources to sub-groups of schools that served socio-economically disadvantaged communities with the aim of assisting these schools to improve educational outcomes. The formulae were usually based on the construction of indices of socio-economic disadvantage by using either population census data or other data available within ministries of education.

Funding schools by formula can provide an appropriate and superior funding mechanism whether schools are administered by a central education authority or are self-managed. That is, it is perfectly possible to secure benefits from formula funding within a centralized system of resource allocation to schools without creating a highly decentralized system of self-managing schools. For example, within a centrally administered school system formula funding of schools can be used to ensure a more equitable distribution of resources among schools, or to encourage the specific use of resources in particular ways deemed important by fund holders. However, it is important to note that the type of organizational system within which schools operate will in part determine how the formula needs to be constructed so as to deliver the kinds of policy outcomes that decision-makers require. This key point is developed and exemplified in this chapter and illustrated in the case study chapters.

Formula funding as an integral part of educational policy

While methods of resource allocation are technical constructions, their selection for use is a fundamentally political decision since each method has particular implications for whoever has

decision-making power and whoever benefits from the resulting distribution of resources. At the same time, a funding formula can be seen as a catalyst for change because of its potential for providing school managers with various incentives and sanctions. For example, funding schools according to the number of students without consideration of the area of school buildings penalizes schools with low student density. Similarly, funding on a per-student basis encourages schools to recruit more students, so long as the marginal or extra cost of an additional student does not exceed the per-student cash allocation.

Funding formulae can thus influence the behaviour of school managers, teachers, and parents through providing financial incentives and sanctions, and also by conveying powerful policy messages. Clearly the nature of these messages and the types of behaviours which they are intended to induce are both areas of contestation in pluralistic societies. The impacts on schools which can be achieved via these processes depend to a great extent upon the degree to which governments have the power to set policy aims and objectives to be achieved via the performance of schools. This varies from country to country – depending upon the constitutional powers of central and local governments with respect to schools and the extent to which they wish to deploy such powers.

A school funding formula may be seen as part of a contract between the government (or its funding agency) and schools, in which schools are paid contractually determined sums of money in return for providing educational services to students and for enabling students to achieve desired educational outcomes. The design of the funding formula and the associated contractual framework setting out what is expected from schools and how it is enforced are policy variables which will be configured differently for each school system. Such arrangements can vary from a tightly specified formula, backed with explicit school performance contracts, to school systems in which the formula is more flexible and is buttressed by largely implicit performance agreements between government and schools.

Education systems vary in the extent to which governments and the ultimate clients of education – parents, children, employers and other members of the community – use different types of co-ordination mechanisms to determine what schools do, how they do it and with what results for which groups and individuals in society. The main mechanisms of co-ordination (Thompson and Maidment, 1993) are administrative means using hierarchical structures and rules, the market mechanism of exchange of goods and services for money, and a general reliance on the professional ethic of providers (teachers and administrators) in serving their clients' interests and

not their own. Any system of service provision will rely to some extent on all three co-ordination mechanisms: what is at issue is the relative balance among them.

The three main policy functions of formula funding

The type of school funding formula appropriate to a particular school system is dependent on the policy objectives the government is pursuing and also on the combination of co-ordination mechanisms reflected in the system's organizational structure. An appropriate funding formula for a decentralized system with parental choice of school will be different from one appropriate for a centralized school system. The design features of a funding formula therefore demand a careful consideration of how policy aims and objectives relate to the key functions which a funding formula can serve. Different policy aims and objectives will imply a different balance of these functions. The three key policy functions of equity, directive, and market regulation are considered below.

(a) Equity function

One of the most important functions of a funding formula is that it can be used within both centralized and decentralized school systems to distribute resources equitably. This distribution will reflect judgements about exactly what can be considered to be equitable levels of resourcing for different categories of students and for schools with varying characteristics. The process of reaching agreement on a formula and its subsequent publication encourages the development of transparent and openly debated policies and rules for school funding so that equity issues are carefully considered and widely understood.

Two forms of equity need to be distinguished. First, 'horizontal equity' which implies the like treatment of recipients whose needs are similar. Second, 'vertical equity' which implies the application of differential funding levels for recipients whose needs differ.

Needs-based funding is an attempt to determine the learning needs of each category of student and the cost of resourcing that need (within overall budget constraints) so that both horizontal and vertical equity considerations are satisfactorily addressed. Formulae can be used to make the allocation of inputs more equitable or in an attempt to make the distribution of educational outcomes more equal. Giving schools the same basic allocation per student differentiated by grade level is crucial in ensuring horizontal equity in the allocation of resource inputs to both students and schools. Adding differential amounts to the basic allocation per student so as to fund

students differentially according to their assessed degree of educational need is an initial step in promoting greater vertical equity.

(b) Directive function

A funding formula is used directively when it contains specific incentives or sanctions for schools which are intended to influence the behaviour of school managers in ways which are consistent with the policy aims and objectives of the funding agency. For example, if the funding agency wishes to sustain small schools and to enable them to deliver the same quality of curricular provision as other schools, then the funding formula could give additional payments to schools with smaller enrolments. To simultaneously promote information technology and community contributions to school costs, for example, the formula could provide matching grants for the purchase of computer hardware and software and for the costs of relevant teacher in-service training.

The equity function can also be directive, since providing extra money for students with supplementary educational needs which cost more to satisfy, provides schools with a financial incentive to admit these students and provide them with enhanced learning opportunities. However, there are good reasons for treating the equity function of the formula as distinct and separate from the directive function. First, the extent to which the equity component of a formula is in practice directive depends on how closely schools are held accountable as to whether the additional resources that they receive are, in fact, used to assist students with special needs. Second, the equity function can be non-directive if, for example, it is focused only on achieving horizontal equity and therefore on establishing a level playing field. A further consideration is that the equity principle is important as an objective to be advocated in its own right in social and educational policies and as a major criterion against which policy impacts are often evaluated by policy analysts.

(c) Market regulation function

The development of sophisticated funding formulae has tended to be a common feature of those school systems that have significantly decentralized managerial responsibility to the school level. In some of these school systems there has been considerable emphasis on parental choice of school and creating a 'quasi-market' or 'market-like' mechanism for the co-ordination of the system. The key feature of a 'quasi-market' (Bartlett et al., 1994) in a public service is the split between the roles of purchaser and provider. The

parent as purchaser selects a school (constrained by rules regarding the rationing of excess demand for places at individual schools) and the education authority or funding agency uses a formula to allocate money to each school according the number and nature of students in given grade levels that it has recruited. According to the quasi-market model, a school as provider should respond to the financial incentives linked to parental choice by providing a high quality of education so as to induce a sufficient number of parents to choose that school rather than an alternative. Failure to do this will eventually result in the school being closed as financially unviable.

In quasi-market conditions the funding formula serves as a contract between purchaser and provider, stating how much money each school will get for providing particular types of educational services – for example educating a certain number of students of given grade levels according to a specific state curriculum. Since in a state-regulated quasi-market, schooling remains free (or subsidized) at the point of consumption, formula funding of schools is a way of providing parents with free (or partially subsidized) schooling while at the same time giving them market power as purchasers.

If funding via a formula is intended to mobilize market forces to induce efficiency and good performance from schools, then the formula will allocate finance mainly on the basis of student numbers. The purely market function of a funding formula is restricted to setting out the financial rules which govern the quasi-market mechanism. In the case of vouchers, the formula would determine the value of the voucher attached to each child and allocated to the parents. Alternatively, as in those countries implementing school-based management approaches, the school budget determined via formula is channelled directly to the school. In a 'pure market' funds would be allocated solely on a per-student grade level basis, leaving it to the market to determine which curriculum areas are favoured by parents and which types of school are financially viable. The only equity principle required would be equal funding of students by grade level.

In practice, as the case studies presented later will demonstrate, funding formulae in school systems contain both equity and directive elements. The degree of emphasis on the market function is reflected through the proportion of the total budget for school education which is allocated on a per-student basis. The proportion of school budgets allocated according to the number of students is not the only indicator of the extent to which market forces are operating in a school system. Other regulations are also important in influencing the extent to which schools compete, such as student admissions regulations, including the extent to which some schools select students by ability.

A funding formula as a contract

Regardless of the relative emphasis policy-makers give to the equity, directive, and market functions of a funding formula, it plays a pivotal role as a contract between the school as provider and the funding agency acting as purchaser, either on its own behalf or on behalf of the school's ultimate customers: parents, children, and citizens. From the point of view of the funding agency it is desirable to design a formula which acts as a contract to induce the maximum possible number of desired behaviours from schools at the least possible cost to the funding agency. At the same time the funding agency has to ensure that the formula does not contain perverse incentives and sanctions which induce school-level behaviour that is inconsistent with, or opposed to, the intentions of policy-makers.

One of the most important illustrations of the use of incentives concerns finding a way to encourage schools to enrol students who are more costly to educate than the majority because they require more inputs or because their behaviour reduces the quality of learning for other students. Success in this area is economically important because failure means that later on society will bear the social costs of children who, because of their poor education, lack employable skills and become disaffected. The problem of providers avoiding taking on costly customers is known as 'adverse selection', and it is usually addressed in a funding formula by providing schools with additional resources for 'at risk' students.

Another key incentive issue is the extent to which the contract is specified in terms of a 'fixed price' or as 'cost-plus'. In a fixed price contract the provider is given a fixed amount for a specified output (for example, a fixed amount for educating a student of a certain age for a year). A funding formula which gives a school a fixed amount per year per-student is a fixed price contract. In a pure cost-plus contract, the provider is compensated by the funding agency for whatever costs the provider incurs in producing the specified output. The historic method of allocation is closer to a cost-plus contract than is formula funding. Under historic funding the existing school staff continue, year after year, to be paid for directly by the funding agency and supplementary cost items, such as school heating costs, are simply invoiced directly to the funding agency. Cost-plus contracts give the provider no incentive to use resources efficiently since the provider does not benefit from any cost reductions it achieves. The opposite is the case with a fixed price contract (or per capita funding), since the school keeps any money it saves on items to spend as it chooses. However, a fixed price contract may be inequitable and fail to achieve equal final outputs from all providers, if the providers have different levels of cost which are

beyond their control. For example, a school that experienced an unexpected costly incident, such as fire or long-term staff sickness, without any financial compensation would have to cut back its spending on direct educational provision for students.

Criteria for assessing a funding formula

There are six main criteria which are usually taken into account for the purposes of either designing a funding formula or evaluating an existing formula. These criteria have emerged over time based on the experiences of the countries surveyed in later chapters. Not all of these criteria are completely satisfied by all of the funding formulae in the countries investigated.

(a) Effectiveness

The effectiveness of an organization may be judged by the extent to which its aims and objectives are achieved (Audit Commission, 1984). To address this criterion in an educational context would require that the amounts allocated per student by a funding formula should reflect the costs of the resources required to provide the quality of education expected of schools – for instance as stipulated in a state curriculum or in agreed educational output performance standards. Effectiveness in education therefore requires schools to search for best practice in teaching and learning, and then to seek to relate funding to this knowledge. For example, if intensive tutoring is required to ensure that all young children learn to read, this implies relatively higher per-student funding for early years in comparison with the later years of schooling. If the government regulates the school system against explicit standards, then the effectiveness of a particular school must be evaluated in relation to the resources that have been provided.

(b) Efficiency

The efficiency of an organization refers to successful management of the relationship between outputs achieved and the cost of inputs used to produce these outputs (Audit Commission, 1984). In relation to designing school funding formulae the efficiency criterion needs to be applied at two stages.

The first stage is deciding how the central expenditure on schooling should be delegated to schools via a budget. Decisions on this matter require a determination of which resources are more efficiently managed at a school level and which at central level. These

decisions can vary depending on whether the existing system is centrally managed or decentralized (Odden and Busch, 1998) or whether there is widespread agreement that important educational decisions are best made at the local level unless there are compelling reasons against this.

The second stage is designing a funding formula for allocating the funds or real resources (for example, teachers) that have been delegated to the school level. Careful attention needs to be paid to the efficiency incentives signalled to schools by the formula. If schools can affect the values of the variables in the formula through their own actions, this can produce inefficient allocation in terms of the government's objectives. For example, the provision of additional funding for small class size may encourage an expensive small class structure to continue. Similarly, the funding of energy costs according to the amount used, or to the amount spent the previous year, may provide schools with no incentive to reduce energy costs.

(c) Equity

How this criterion is to be interpreted is a sensitive policy issue. The formula as a technical construct can only reflect political judgements about equity. However, it is important for the equity implications of a particular technical configuration of a funding formula to be made clear to those who are making policy decisions. To be equitable a funding formula needs to reflect cost differentials due to:

(i) Supplementary educational need. A major equity issue tackled in most funding formulae is the allocation of additional funds for students with supplementary educational needs that are manifested in various forms of learning impairment or difficulty. In systems where schools can select students, additional funding for supplementary educational need helps to counteract adverse selection by schools.
(ii) School site cost differentials. Another equity consideration is to ensure that the formula adequately compensates schools for differences in their unit costs which are due to specific characteristics of the school and which are beyond its control. Such cost differences arise due to factors such as small size, isolation, or buildings which are more costly than average to operate and maintain.
(iii) Regional cost variations. The costs of school inputs can vary across regions within the school system by up to 40 percent (Chambers, 1995). A price-of-education index can be developed and used in the formula to adjust the value of dollars

allocated so that the purchasing power of a dollar is equalized for all schools.

(d) Integrity

The integrity of a funding formula is important if the goal is to prevent a funding approach from degenerating into one based on skilful, but unfair, manipulation of information. For this reason the indicators used in a formula should be non-manipulable by the school. To illustrate, if tests of educational achievement are used to allocate more money to schools that have lower student achievement, then schools have a financial incentive to create the appearance of poor educational achievement. Care should be exercised where indicators which are collected by the school, for example social or occupational class of parents, can be manipulated by the school through judicious selection of categories into which parents are placed.

(e) Administrative costs

The formula should be easy to construct, maintain over time, and utilize in making budget calculations for schools. The statistical property of parsimony in the use of measurements contributes to low administrative costs.

(f) Accountability and transparency

The formula should be 'transparent' in that it can be readily understood by the policy-making community and schools' stakeholders. This feature promotes participation in decision-making about the formula, and also ensures higher levels of accountability of the funding agency and schools to their stakeholders.

(g) Local democracy

In situations where educational administration and financing is decentralized (for example, to regions or authorities), the formula should provide opportunities for local democratic decision-making. This implies that a central government should leave discretion to the appropriate lower administrative level to operate locally distinct formulae.

(h) Sensitivity to local conditions

The formula should be capable of being adjusted to accommodate locally differentiated needs and situations. This is a particularly

important criterion where costs related to school size are being examined.

Not all the criteria above are mutually consistent. For example, increased levels of local discretion may be inconsistent with nationally agreed equity benchmarks because they result in large differences in the allocation of funds for specific types of need. Such allocative outcomes may also not be consistent with viewpoints on establishing a more efficient national system of funding educational need. Similarly, formulae which allow for many kinds of supplementary educational need and school site cost differentials may become overly complex and therefore less transparent.

The main message here is that there is no single 'best practice' formula. Rather, each formula needs to be judged against the policy objectives that it is intended to serve and the relative importance given to the different evaluative criteria.

The design structure of a funding formula

The manner in which a funding formula is actually configured for a school system will depend upon decisions which reflect policy choices related to the three main functions of a funding formula and the criteria for assessing a funding formula outlined above.

There are several key questions that need to be addressed with respect to the structure of a funding formula. The first question is concerned with the preparation of rules which specify exactly what resource levels are to be retained under the control of the funding agency, and exactly what resource levels are to be allocated among schools via a funding formula. In situations where school-based management models are to be applied the answer to this question will define the resources that are to be placed at the disposal of schools. In more centralized school systems the answer will define what schools are 'entitled to' as part of a centrally held total budget. The other three key questions cover the movement from the policy intentions of the funding formula through various stages of operationalization which represent the mechanical procedures required to build and implement the formula. The four questions are presented and discussed below.

What level of resources should be allocated to schools via a funding formula?

As stated earlier, this book is concerned primarily with procedures related to the distribution of educational resources (in the form of a total budget for schooling) among schools and not with the generation of such a budget – except insofar as needs-based funding for

47

distributing the budget should encourage the adoption of the same principles for budget generation. Our starting point then may be described as the 'Total Schools Budget' which covers all recurrent expenditures both direct and indirect for all schools and their students in the school system being funded. The central question hence becomes: what level of resources from a total schools budget should be allocated among (or delegated to) schools?

How this question is answered will depend on the functions which the funding formula serves. For example if the main function is market regulation, then there is a clear presumption in favour of a high proportion of the total schools budget being delegated to schools. The criteria for assessing a funding formula are also applied in deciding which items of expenditure are best delegated and which retained centrally by the funding agency or education authority. The subsidiarity principle (that decisions are best taken at the furthest distance from the centre by those actively engaged in providing the service) gives more weight to greater delegation to schools on the grounds of efficiency and effectiveness. However, there are certain situations which favour central retention of some expenditure decisions. These include:

(i) Some short-term or emergency expenditures have a very uneven incidence with respect to individual schools (for example, capital projects and structural repairs, staff early retirements, and various emergencies).
(ii) The funding agency, and not the school, has an ownership interest in the school buildings.
(iii) The resources available for education have been 'earmarked' for certain projects under government specific-purpose grants.
(iv) The education authority has statutory responsibilities (for example, to implement 'integration' programmes for children formerly assigned to 'special schools').
(v) Certain economies of scale favour central provision because unit costs decline with the volume of service produced.
(vi) Situations where it is judged that schools would not make adequate provision (for example, insurance for school council members, and in-service training for staff and school council members).

The proportion of the total schools budget that is *not* delegated to schools is referred to in this book as 'retentions'. These retentions fall into two categories: essential retentions, and optional retentions. Essential retentions are those expenditures which the education authority has a statutory obligation to carry out on behalf of children of school age or of the school system (for example, integration programmes for handicapped children) or which could not be

delegated to schools (for example, the cost of a director or superintendent of education and his/her secretariat). Optional retentions refer to expenditures that could either be delegated or held back, depending on prevailing constraints associated with how the criteria listed above are interpreted.

The relationship between the delegated and total schools budget is:

Delegated schools budget = Total schools budget
– Essential retentions
– Optional retentions

In addition to rules regarding retentions, the application of formula funding generally includes restrictions on how each school may spend its delegated budget. A common restriction relates to the employment of teachers. In some systems the funding agency remains the employer of the teachers and therefore a school can only determine the number of teachers on the establishment – with appointments and dismissals being outside a school's control. There may also be restrictions on the firms with which schools can trade or on the types of contract they can make for services. In addition, certain financial regulations, for example those covering the authorization, recording, and reporting of expenditure and income, are required in order to ensure financial probity.

Having determined the overall resource level that is to be delegated to schools the next step is to apply a formula for distributing these delegated resources among schools. This process proceeds by answering the following three questions.

What separate components should be addressed by a funding formula?

Each component addressed by a funding formula relates to a distinct purpose for which resources are required. Recent experience in several countries that have used formula funding shows that most of the components can be grouped under four categories: basic student allocation, curriculum enhancement, student supplementary educational needs, and school site needs.

A major decision which will be reflected in the choice of components is the unit of funding. What is being funded? In particular, is the student the unit of funding, or is it a teaching group or class, a school, or the school site? A formula can contain a number of different units of funding. For example, it can contain both the student and the school site as units of funding.

In the examples developed below it is assumed that the student is the main unit of funding and that it is students as inputs – as measured

by numbers on the school roll – who are funded. Ideally, if the formula is to encourage schools to maximize educational effectiveness, a funding agency would wish to allocate finance according to schools' outputs rather than their inputs. However, it is difficult to develop appropriate school output measures when expected educational outcomes are diverse, difficult to define, and not readily quantifiable. Those school outputs that are more easily quantifiable, such as test and examination results, are heavily dependent on the characteristics of students, in particular their social background and ability – and therefore sophisticated statistical procedures are required to generate 'adjusted' output measures. There are also the important issues of ensuring that output measures are not capable of being manipulated by schools, and that undesirable incentives are avoided so as to prevent the risk of adverse selection of students by schools.

The four main components of a funding formula

Component 1: Basic student allocation

The basic student allocation is made up of two sub-components.

(a) A basic allocation. This may be a per-student allocation, or be an allocation per teaching group, or a base allocation per school defined in terms of number of students. When the teaching group is the unit of funding the formula will contain assumptions about what is the maximum permitted size of a teaching group before a large class is split into two because of an 'extra student' that has triggered off an additional class and its associated requirement of teacher time.
(b) A grade-level supplement. This provides differentiated supplementary funding by grade level, year group, or age level, the terminology used here often varies across school systems.

Giving each school the same amount per student differentiated by grade level implies a fixed-price contract approach because the basic student allocation reflects the costs of educating students with 'normal' educational needs. This is a cost assumption made by the funding agency responsible for designing the formula. However, to satisfy the criterion of effectiveness the basic student allocation should be derived from an explicit analysis of the resources needed to deliver a specified level of educational provision and the costs of those resources. One form of cost analysis is known as activity-led costing and this technique will be discussed in more detail in a later chapter. Just taking the sum of money generated by a budget-setting process that is not based on an analysis of expenditure requirements

and then dividing this by the number of funding units does not satisfy the criterion of effectiveness – since there is no linkage between the amount of expenditure allocated and any specification of expected educational standards and quality.

The generation of the first component impacts upon the effectiveness, efficiency, transparency, and administrative cost criteria. It should also be noted that if all students in a given grade level cost the same to educate regardless of which school they attend, then a needs-based funding formula would not require any more components. The market regulation function of the formula is catered for by Component 1 alone since it establishes how much a school receives for recruiting and retaining a student on its roll.

Component 2: Curriculum enhancement

In addition to differentiation by grade level, some education systems provide an enhanced curriculum for certain students, often selected in some way by ability or aptitude. These programmes usually focus on specific subjects: for instance music, sport, languages, technology, mathematics, or science. The curriculum enhancement is provided in particular programmes within mainstream schools or in specialist schools. Component 2 is an addition to the basic student allocation which addresses the cost of an enriched curriculum and applies only to selected students or schools.

Component 2 is particularly associated with the directive function of a funding formula. The funding agency can encourage schools to focus on particular types of curricula by providing financial incentives. Providing the formula reflects the differential costs of curriculum enhancement, the effectiveness criterion is satisfied if the formula induces schools to develop areas of the curriculum favoured by policy-makers.

Component 3: Student supplementary educational needs

The third component relates to differences in students' characteristics which result in some students requiring additional resources in order to provide them with the same level of access to the curriculum that is enjoyed by most students at their grade level. A modification of the basic fixed-price contract approach is required in order to account for the higher per-student expenditure required in schools with students with supplementary educational needs.

The equity criterion in relation to outcomes is of particular salience in designing Component 3 of the formula. The procedures involved with the identification of students to benefit from funds directed towards responding to supplementary educational needs will be examined in more detail in a later chapter.

Component 4: School site needs

The unit of funding for Component 4, unlike the first three components, is the school site. This component allocates additional sums to schools for having higher site-related costs due to structural factors that are generally beyond the managerial control of the school. If schools differ in their per-student costs for reasons which are structural and cannot be changed by the school's management – at least not in the short term – then an equal allocation per student would mean that students in schools with higher unit costs per student will receive a lower value of educational services. The criteria of educational effectiveness and equity justify modifying the fixed-price contract to reflect structural differences in school site operation costs.

There are a number of school site factors which give rise to above average unit costs. One set relates to differences in physical aspects of the school site such as buildings which are more expensive to heat or maintain, or multi-campus sites which involve extra travel costs. Isolation from centres of concentrated population is another factor which raises school costs. A further factor is regional differences in the prices of educational resources, which need to be adjusted for by constructing an education price index.

School size in terms of student numbers is also an important determinant of unit cost. Unit or average cost per student is made up of average *fixed* and average *variable* costs. The latter can reasonably be assumed constant as school size falls, but average fixed costs rise as the size of school decreases since fixed total costs (for example, the minimum costs of a headteacher, premises, and providing a variety of subjects) do not diminish with the number of students. A key concept here is that of 'minimum efficient size' which represents the minimum size of a school at which average cost per student approaches its lowest feasible value. As school size (in terms of students) increases beyond minimum efficient size, then average costs cease to decline or only decline very gradually with increased size. Thus in devising a funding formula a judgement has to be made about the extent to which small schools should be supported by additional allocations. For example, maintaining small schools in sparsely populated areas is often cheaper than transporting children to fewer larger schools, as well as yielding external social benefits from preserving rural communities. In contrast, financial support for small schools in urban areas may perpetuate inefficient school structures.

In designing a formula with respect to the fourth component the most relevant criteria are sensitivity to local conditions, efficiency (because of structural characteristics which automatically generate efficiency differentials), equity (ensuring all school sites can offer the same level of educational provision from the funding they

52

receive), and effectiveness (ensuring that each child achieves the attainment level expected for his/her age and ability). School-specific factors will be considered in more detail in a later chapter.

Relating components to functions

The selection of components for inclusion in a system of formula funding needs to relate to the various functions expected of the formula. Differential degrees of importance attached to the equity, directive, and market functions will imply differential weightings given to each of the four components listed above. As an extreme case, a formula might focus on only one function. For example, where the funding agency was concerned only with the market regulation function, then the formula would be concentrated almost entirely on the first component.

The more a formula is designed in the context of social policies for supporting communities and individuals the more it will need to encompass Components 3 and 4. In contrast, the more a formula is designed to support or encourage change towards certain curriculum specialities, the more it will need to concentrate on Component 2. Clearly the equity function of the formula will focus on Component 3, while the directive function will be reflected in Components 2 and 4.

Dimensions of the components

Once the broad components of the formula have been determined the next step is to operationalize the formula as a means of delivering finance for each of the components. This requires various decisions to be made with respect to the units of funding and the constructs or 'dimensions' to be included for each component. A hypothetical example of the linkages between the four components of a funding formula and the dimensions related to each component has been presented in *Table 3.1*.

For Component 1, the unit of funding needs to be specified as students, places, or teaching groups. With respect to students it may be necessary to specify full-time equivalent students in order to take account of part-time attendance. If there is to be differentiated funding according to grade level, then this needs to be defined. For example, in the United Kingdom students are classified into year groups according to the academic year (from 1 September and 31 August) in which they were born, and then each grade level is funded differentially.

The dimensions of Component 2 will be determined by definitions of which areas of the curriculum should attract additional funding.

Table 3.1. Hypothetical example of the relationships among components, dimensions, and indicators in the development of a school funding formula

Components	Dimensions	Indicators
Component 1: Basic student allocation		
1(a) Basic allocation	1(a) Total enrolment	1(a) Total FTE at time of school census
1(b) Grade level supplement	1(b) Grade level differentiation	1(b) Total FTE in each grade level
Component 2: Curriculum enhancement		
	2(a) Specialist curriculum	2(a) FTE enrolled in foreign languages
	2(b) Specialist school	2(b) Total FTE (if technology school)
Component 3: Student supplementary educational needs		
	3(a) Socio-economic disadvantage	3(a) % students on welfare benefits
	3(b) Non-fluency in language	3(b) % students below cut-off (language test)
	3(c) Low educational achievement	3(c) Number of students below 20th percentile (general ability test)
	3(d) Disabilities, impairments, and learning difficulties	3(d) Number of students formally assessed
Component 4: School site needs		
	4(a) School size	4(a) Primary:FTE< 200 / Secondary:FTE<600
	4(b) Location (in terms of isolation)	4(b) Kilometres to town of 50,000+ persons
	4(c) Site running costs (clean, heat, maintain)	4(c) Interior area of school in m^2

Schools may be funded per capita for students or allocated a sum for running a particular programme.

The dimensions of Component 3 cover supplementary educational needs and therefore must reflect broadly-defined factors which give rise to additional costs for giving all students an opportunity to have full access to the curriculum and to be successful in their educational achievements. The most commonly selected dimensions in this area seek to assess supplementary educational need arising from four sources.

(a) low socio-economic status (for example, unemployment, poverty, ethnicity, and itinerancy);
(b) non-fluency in the language of instruction;
(c) low educational achievement; and
(d) disabilities, impairments and learning difficulties.

These four sources of supplementary educational need are often overlapped. The complex issues concerned with identifying indicators of supplementary educational need will be addressed in a later chapter.

The dimensions of Component 4 are concerned with various aspects of the school site and can be quite varied. An important dimension is the size of the school measured in terms of student numbers. Another dimension is isolation of the school and its community. Other dimensions include the area and physical characteristics of the building and the school grounds. These dimensions are considered further in a later chapter.

Indicators of the dimensions

The final step is to create indicators or measures of the dimensions which will be entered into the formula. A hypothetical example of the linkages among the four components, the dimensions related to each component, and the possible indicators that can be used to measure each dimension has been presented in *Table 3.1*.

Each indicator has to be defined in detail since it is this measure that is entered into a funding formula to calculate each school's budget. For example, a Component 1 dimension – the number of students enrolled in a school – must have a precisely-defined method of measurement. This is not an unproblematic issue since student numbers fluctuate through the school year, with some schools experiencing much greater fluctuations than others. Particular problems arise when, as in the United Kingdom, the financial year starting in April does not coincide with the academic year beginning in September. In this case, the school budget for the next financial year

has to be worked out and allocated before the actual number of students enrolled in September is known. In the United Kingdom the Department for Education and Employment carries out an annual census of school enrolments on one day in January and this 'census' student count is used for funding purposes. Similarly, eligible students and programmes have to be defined for Component 2 – curriculum enhancement.

Determining indicators for Component 3 – student supplementary educational need – has a relatively long history which predates formula funding for the purposes of delegating school budgets. Any selection of indicators needs to reflect sensitive policy decisions as to which groups are to have supplementary funding and how the presence of such students in schools is to be measured. There are two basic types of indicators for supplementary educational need (Marsh and Levačić, 1995):

(a) indicators that predict the incidence in each school of students with supplementary educational need; and
(b) indicators that identify individual students with supplementary educational need and, within these, indicators that measure the extent of identified supplementary educational need.

For example many poverty indicators, such as the percentage of children from families on state welfare benefits at each school, correlate with the average educational achievement level of students for each school. However, while a poverty indicator of this kind is quite good at predicting the average incidence of learning difficulties at each school, but it is often not so good at identifying individual students who are low achievers (Marsh, 1995). Educational tests (for example, of reading or non-verbal reasoning) are suitable for identifying particular children with learning difficulties. In contrast, professional assessment is needed to identify children with behavioural problems and to differentiate more finely between different forms of learning need and their resourcing implications.

If the various technologies of learning were well established it would be possible to know the precise amount of additional resources required by a student with a particular learning difficulty in order to attain a given educational outcome. This knowledge would inform the choice of an appropriate indicator and the amount of supplementary assistance needed for each scale point on the indicator. In practice this information would require an enormous input of time and effort to collect, even if a professional consensus on the relationships among learning needs, learning objectives, and resource requirements could be established. In the absence of such information, judgements have to be made about the amount of additional resources that should be allocated to meet the costs of supplementary

educational needs and how these resources should be distributed. In some cases this comes down to a question of finding an acceptable way of allocating a fixed sum of money among competing claims. A funding formula would then express the outcomes of this decision – in full acknowledgement that such decisions may be influenced by both professional judgement and political pressure from affected interests.

Within Component 4, a definition of what is to count as a small school has to be established for the purposes of funding. The size definition will depend on the grade levels of students in the school (that is, the phase of schooling) and on the average size of schools in the same phase in the school system. In order to construct an indicator of school size, agreement must be reached on whether there will be a cut-off point under which all schools are defined as 'small' or whether the definition will include a tapering-off effect, so that schools receive additional funding according to their 'degree of smallness'. Other indicators for this component may need to be defined in terms of categories (for example, different types of buildings), or in terms of an internal scale (for example, defining split sites according to distances apart and/or travelling time between sites).

Indicators need to be carefully selected with reference to the formula criteria set out above. For example an 'effective' supplementary educational need indicator is one which has the highest accuracy in predicting incidence of such student characteristics in schools or in identifying students with specified supplementary educational need. Many of the desirable statistical properties of indicators in funding formulae contribute to the effectiveness criterion (Ross, 1983).

A particular problem which can arise with the use of indicators in funding formulae is that of 'moral hazard'. This may occur when a contract is specified in such a way that the contractor is given perverse incentives to raise costs or reduce quality. Actions leading to these distortions may be quite legal because they may simply represent a form of 'playing the rules of the funding game' to benefit the school. In other situations such actions can be illegal – as in reporting students for funding purposes who do not exist on the school roll. An often-quoted example of moral hazard can occur if schools are funded according to an indicator of supplementary educational need which the school itself can influence in order to achieve financial gain (for example, through the way tests are administered, data on indicators are collected, or students assessed or taught).

With respect to both Components 3 and 4, the problem for formula design is to select indicators so as to modify the common fixed-price contract delivered by the first component in order to fund differentially for legitimate differences in unit costs which are beyond the control of the school. A lack of compensation for these cost

differentials would result in students attending the more costly schools to receive a poorer quality of education because resources for direct educational provision would be absorbed in higher operational costs per student. Action in this area to fund such cost differentials also needs to avoid generating incentives for adverse selection or moral hazard.

An indicator which finally appears in the funding formula may be directly derived from a measurement of the dimension or it may be a more complex composite indicator generated from a number of measures. For example, some local education authority formulae in England estimate enrolment levels by taking a 50:50 weighting of the number of students counted in the previous January and estimates of the number which will be enrolled in the school at the start of the academic year in September. The student count for the purposes of the funding formulae is therefore an algebraic construct and does not map to actual students. Similarly, the number of full-time-equivalent students (given as 'FTE' in *Table 3.1*) is a composite indicator, since different weights are attached to different numbers of hours of weekly attendance. The supplementary educational need indicator in a formula is also often a composite indicator, for example an aggregation of two or three educational test scores and/or of several social disadvantage indicators.

Table 3.1 shows the relationship among components, dimensions and indicators using hypothetical examples of dimensions and related indicators for each component. For example, the basic student allocation in the example is allocated on a per capita basis according to the number of full-time equivalent (FTE) students at the time of the school census. Alternatively it could be allocated according to the number of teaching groups or classes a school is assumed to require given its student numbers and their grade levels. The latter approach is appropriate in systems in which there are legal maxima for class size.

Coefficients attached to the indicators

The indicators are the units of measurement which attract funding in the formula. In order to deliver a sum of money each indicator in the formula must be multiplied by coefficients which are the monetary values attached to scale points or categories on the indicators. In a needs-based funding formula the coefficient is derived from the estimated 'extra costs' of the educational provision or operational services included in each of the components. The final formula may therefore be conceived as a summation of indicator values multiplied their respective coefficients in order to reach a final funding amount.

(a) Coefficients for Component 1

The coefficient attached to the number of students is the amount a school receives per year (or other period of time) for one student (as measured for funding purposes) in a particular grade level. This is the cash allocation per student – which is sometimes referred to as the student allocation weighted by grade.

In a needs-based formula the cash unit per student is derived from an analysis of what resources are required to deliver a basic provision for one student in a school of minimum efficient size, and how much these resources cost. These costs include the direct costs of teaching and learning in the classroom and the educational materials used to support learning, the indirect costs of administration and school management, and the operational costs of the school premises which can be attributed to the number of students. Additional allocations for grade levels (for example, for smaller classes for very young children to ensure literacy, and for older students because of providing specialist subjects and curriculum choice) are similarly worked out on the basis of the cost per student. All costs which vary with the number of students can be included in the basic allocation, though not all formulae do this, as will be evident in the case study chapters.

The appropriate coefficients for the per student or the teaching group grade-level indicators can be calculated using a method known as activity-led funding. This is a particular application of needs-based funding which involves costing the staffing and other resources required for a school to deliver a specified level of educational provision to its students. Activity-led funding methods, which are explained in a later chapter, concentrate on estimating the costs of teaching, learning support (non-teaching staff and learning resources), and management.

Site costs, although normally managed under Component 4, can also be allocated on a per-student basis so long as a good relationship between the number of students and school site costs has been established. For example, the formula could allocate each school $3,000 for premises costs plus $50 per student. Those site costs that do not vary with student numbers should be allocated on a different basis, such as area of building and grounds and type of building. In the framework presented in this chapter, these site costs are analyzed under Component 4. Site costs are dealt with more fully in a later chapter.

(b) Coefficients for the other components

Coefficients for the indicators of curriculum enhancement under Component 2 are appropriately derived using activity-led costing for specified curriculum enrichment. Coefficients for the indicators of

supplementary educational need under Component 3 can also be derived from activity-led analysis, though this approach is difficult to implement in this area because of the large number of differences in individuals and their learning needs. Hence the analysis of funding requirements of special schools and units for children with physical disabilities and learning difficulties must be undertaken as a separate though related exercise to the formula funding of mainstream schools. The socio-economic status indicator for students in mainstream schools is often used to allocate a politically generated sum of money for the purpose. In this case the funding allocation is more a question of judging what coefficients to use for different forms of social disadvantage, and this often becomes a sensitive political issue. The derivation of supplementary educational need indicators and related coefficients is addressed in a later chapter.

With respect to the funding of school site needs under Component 4, the impact of small school size on the cost of delivering a specified curriculum can also be analyzed using the activity-led approach. Such an analysis can provide cost estimates for additional teachers and other resources required per student in a small school to provide the same level of educational provision as in a school of minimum efficient size. Below minimum efficient size a school has significantly higher average costs per student. It is these schools which need to be compensated for in a formula for equity reasons. However, from an efficiency point of view, the education authority also needs to decide whether the higher average costs of small schools are justified in relation to the needs of children, families, and communities.

In determining the appropriate amount of additional funding for small schools, the positive impact of small class size on educational achievement needs to be taken into account. There are also less costly ways of coping with smallness than providing a much lower than average student/teacher ratio. Alternatives include mixed-age teaching, several schools sharing specialist staff, and the use of distance learning techniques.

If school site costs (for example, heating, maintenance, water, administration) are not closely related to the number of students at each school, the funds to meet these costs need to be allocated under Component 4 according other indicators, such as the area of school buildings and grounds, the age of school buildings, etc.). These issues will be discussed in a later chapter.

Hypothetical examples of funding formulae applied to individual schools

Having reviewed the various ways of deriving coefficients to attach to the indicators for the dimensions of the four components,

some hypothetical examples of simple formulae are offered in *Table 3.2* in order to illustrate how a different balance of the three main policy functions of formula funding (equity, directive, and market regulation) can produce different budget allocations for individual schools. Two fictional schools are considered.

School A is a large school in an urban setting that serves a poor community and has only around one fifth of its students included in a specialist language programme. The total enrolment of this school is 1,000 and there are 200 students in Grade 1. There are 200 students attending specialist language classes and 400 students from families that receive welfare benefits. The school is larger than the minimum threshold of 500 students and is located 20 kilometres from a large town. The total floor space of the school buildings is 8,000 square metres.

School B is a small school in a rural setting that serves a relatively well-off community and has most of its students involved in a specialist language programme. The total enrolment of this school is 400 students and there are 80 students in Grade 1. There are 300 students attending specialist language classes and 10 students from families that receive welfare benefits. The school is 100 students smaller than the minimum threshold of 500 students and is located 220 kilometres from a large town. The total floor space of the school buildings is 4,000 square metres.

Three funding formulae have been presented in *Table 3.2.*

A 'Market Formula' – which is concentrated solely on the two indicators concerned with the enrolment of schools. This formula has coefficients of $2,000 per student for the total enrolment and a coefficient of $108 for each Grade 1 student. All other indicators have zero coefficients. The implied function of this formula is to encourage schools to expand their enrolments – irrespective of the communities that they serve, programme specializations, school locations, or school running costs.

An 'Equity Formula' – which is relatively less concentrated than the Market Formula on school enrolment and gives more recognition of student characteristics, school location, and school running costs. This formula allocates $1,600 per student for total school enrolment, and $108 for each Grade 1 student. A very large amount of $1,271 is added for each student from a family on welfare benefits. Additional amounts of $44.45 are added for every kilometre beyond the school isolation threshold of 20 km from the nearest large town, and also $2.50 per square metre of building space to address running costs. The implied functions of this formula are to 'reward' schools for coping with the problems associated with teaching larger numbers of students from families on welfare benefits and students from families in isolated communities, and to provide a small amount

Table 3.2. Budget allocations to two schools under three different formulae – with the total budget held constant

Indicator	Indicator values		Coefficient ($)			Budget allocations under different formulae ($)					
						Market		Equity		Directive	
	School A	School B	Market formula	Equity formula	Directive formula	School A	School B	School A	School B	School A	School B
C1: Basic pupil allocation											
FTE enrolment	1 000	400	2 000.00	1 600.00	1 708.64	2 000 000	800 000	1 600 000	640 000	1 708 640	638 456
FTE in Grade 1	200	80	108.00	108.00	108.00	21 600	8 640	21 600	8 640	21 600	8 640
C2: Curriculum enhancement											
FTE in language classes	200	300	0.00	0.00	600.00	0	0	0	0	120 000	180 000
C3: Student specific											
Pupils on welfare	400	10	0.00	1 271.00	0.00	0	0	508 400	12 710	0	0
C4: School specific											
School size: threshold of 500	0	100	0.00	0.00	300.00	0	0	0	0	0	30 000
Isolation: nearest town >20 kilometres	0	200	0.00	44.45	239.52	0	0	0	8 890	0	47 904
Running costs: area in square metres	8 000	4 000	0.00	2.50	2.50	0	0	20 000	10 000	20 000	10 000
Total budget						2 021 600	808 640	2 150 000	680 240	1 870 240	960 000
Allocation per pupil						2 022	2 022	2 150	1 701	1 870	2 400

of extra assistance to schools that have to maintain buildings with a large floor space.

A 'Directive Formula' – which is also relatively less concentrated than the Market Formula on school enrolment and gives greater acknowledgement to specialized language programmes and small schools in rural areas. This formula allocates similar amounts as the Equity Formula for enrolment, but includes a very large coefficient of $600 per student for specialized language classes. The formula does not recognize students from poor communities, and instead gives substantial weighting to smaller schools in isolated settings. The implied functions of this formula are to encourage the provision of specialized language programmes and to ensure that small schools in rural areas can survive without the need to combine with other nearby schools. While some extra funding is provided to assist schools to maintain buildings with a large floor space, the amount is so low that it would not be appropriate to interpret this as an encouragement to schools to have (or expand to) buildings with more floor space.

The three pairs of columns in *Table 3.2* provide the budget allocations for School A and School B for each of the three formulae. It is important to note here that these calculations were prepared for a hypothetical school system consisting of only two schools and a fixed total schools budget of $2,830,240.

The final row of figures in the table provides a summary of which school was either the 'winner' or the 'loser' under each of the three different formulae. Both schools obtained an equal amount of $2,022 per student under the Market Formula. School A emerged as the winner under the Equity Formula by receiving $2,150 per student compared with $1,701 per student for School B. In contrast, School B received $2,400 per student under the Directive Formula, which was much more than the $1,870 per student received by School A.

The hypothetical examples listed above illustrate how decisions made concerning the dimensions, indicators, and coefficients can govern the functions of funding formulae and also arrive at substantially different funding outcomes per student. This discussion has sought to map this complex interplay of value systems, research knowledge, measurement parameters, and policy functions – with the purpose of bringing more transparency into the fundamental steps that are taken during the construction of funding formulae.

Conclusion

This chapter has set out the basic principles for the design of school funding formulae. To do this it has shown how a rationally designed needs-based formula should reflect policy intentions by relating the formula design to the balance of functions it serves and

to judgements about how it should perform against key criteria. The final numerical example illustrated how the broad theoretical perspectives with which the chapter opened may be translated into the technical details of formula implementation.

A key theme for this and other chapters is that school funding formulae can be designed to reflect a wide range of public sector allocative systems. The major policy thrust underpinning a funding formula may be equitable resource allocation within a centralized school system or it may be contributing a vital part of the regulatory framework for an education quasi-market. An important point made in the chapter was that a school funding formula cannot be designed or evaluated in isolation from the policy context and regulatory framework in which it is set and which affect how it operates. This important theme will be illustrated later in the case-study chapters.

While a formula is disaggregated into components in order to focus attention on the purposes served by each component and to enable work on formula design and testing to be apportioned amongst different administrators and stakeholder groups, any evaluation of a proposed or actual formula must consider the formula as a whole. A final evaluation of the formula funding approach therefore requires an assessment of the interactions of components, dimensions, indicators, and coefficients in association with the overall set of incentives and sanctions which they provide and the extent to which they promote policy aims and objectives for the school system as a whole.

Appendix on terms

Since different countries tend to use different terms for essentially the same concept or variable we have developed a vocabulary of common terms for use in this book. In the case study chapters the equivalence of the common terms to the national ones is indicated where appropriate. Our definitions of these terms are given below.

Term	Definition
Activity-led funding	A funding approach based on an analysis of the actual costs of the activities required to provide and support specified educational programmes.
Administered school system	A school system in which the decision-making power with respect to the main management functions in schools (curriculum, finance, staff, admissions, infrastructure) is exercised by an education authority through hierarchical structures and rules.

Adverse selection	A funding or pricing system that gives producers an incentive to avoid or to discriminate against customers for whom it is more costly to provide services.
Coefficient in a funding formula	The cash amount attached to the scale value on an indicator.
Components of a funding formula	The building blocks of a formula: each component relates to a main purpose for allocating funds to schools.
Delegated schools budget	The portion of the total schools budget which is delegated to schools for them to decide how to spend.
Dimensions of a formula component	The various aspects of a component which define the component in operational terms.
Education authority	A government or other organization (for example, a religious organization) that has administrative responsibility for a group of schools. This will often be the same as the funding agency.
Funding agency	An agency that funds schools directly (for example, Ministry of Education, local or state government education department, or a non-governmental organization).
Funding formula	A set of methods, principles, and rules which are objectively and consistently applied to distribute resources to schools.
Indicators in a funding formula	The quantitative measures of a dimension.
Minimum efficient size of school	The smallest size of school of a specific type at which the average cost per student no longer falls substantially as size increases.
Moral hazard	A funding system that gives providers an incentive to act against the interests of the funding agent or of the customers whose interests the funding agent represents.

Needs-based school funding	An approach to funding schools that acknowledges that certain student and school characteristics result in schools being required to spend different amounts in order to deliver a specified quality of education for their students.
Retentions	The portion of the total schools budget which is not delegated to schools but which is held back by the funding agency for it to allocate.
Essential retentions	Items of expenditure which must be centrally retained.
Optional retentions	Items of expenditure which may be centrally retained or which may be delegated.
School-based management	An approach to school management that gives a significant degree of decision-making power over the main functions of school management (curriculum, finance, staff, admissions) to the School Governing Board and/or the School Principal.
Student allocation weighted by grade	The cash allocated for one student in a specified grade level.
Supplementary educational need	The needs of students who have certain personal characteristics which give rise to learning needs that are additional to or highly differentiated from those of the majority of students of similar age.
Total schools budget	The total budget available for financing all expenditures relating to all schools financed by the funding agency.

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Part II
The four main components of formula funding

Chapter 4

Component 1: Basic student allocation

Ibtisam Abu-Duhou, Peter Downes and Rosalind Levačić

Introduction

For a funding formula to be 'needs-based' it must be derived from an analysis of the resources needed to deliver a specified curriculum for particular students in specific school contexts. Activity-led funding is an analytical procedure for doing this. It focuses on the teaching and learning activities required by the educational programme provided for students and costs the staff and non-staff resources required. Activity-led funding supports the principle of effectiveness because the cash allocations per student are derived from an explicit analysis of the costs of the resources needed to deliver a specified level of educational provision. It is also an equitable method of allocation because students with the same curriculum entitlement and same learning needs are funded the same amount.

The activity-led funding analysis starts off with assumptions about class size, number of hours students are taught per week/year, and the non-face-to-face hours teachers require for preparing lessons, curriculum planning, assessment, recording and reporting, pastoral work, etc. The number of support staff working directly to support teaching and learning are then estimated and included. Additional sums are allocated for 'curriculum support resources' such as books, materials and equipment. All these are direct costs because they can be directly attributed to the staff and non-staff resources used when teaching and learning activities take place.

Other resources required are indirect costs such as management and administrative staff time, time for activities related to student welfare and career counselling, and so on. These resources are required for teaching and learning to take place but cannot be directly attributed to any one activity. Strictly speaking the indirect costs are not activity led, but they are required in order for the activities as a whole to take place. The indirect or overhead costs may be apportioned to the activities (according to an agreed apportionment rule) and added to the direct costs to derive the total direct and indirect costs of the activities.

At this point a **per-student weighted average cost** can be calculated as the size of the coefficient to be attached to the number of students differentiated by grade level in the funding formula. Once

60

both the teaching and learning resources and the physical resources are determined then the costs can be recalculated annually as prices change, without redoing the activity analysis itself.

In this chapter, we define activity-led funding analysis in more detail and then explain methods for undertaking this analysis in order to support the construction of funding models which can be used by a funding agency or education authority. In the final section, an assessment of activity-led funding is provided. In this discussion activity-led funding analysis is limited to examples of providing for students with normal educational needs in schools of minimum efficient size (that is the size at which average cost per student ceases to fall or only falls very slowly as student numbers increase). The procedures explained in this chapter could be used to determine the costs of educational provision for students with supplementary educational needs or to adjust the funding formula to enable schools of below minimum efficient size to offer the same or similar range of curriculum offerings as larger schools.

Definition of activity-led funding

Activity-led funding is an approach to resource allocation among schools that is guided by a funding formula based on an analysis of the costs of the teaching and learning activities required to provide and support specified educational programmes for students in specified grade levels. The systematic steps required to undertake a detailed audit of all major elements of teaching and learning within schools and then to transform this information into costs for each element and then into a formula for funding is often referred to as activity-led funding analysis.

There are three aspects of activity-led funding analysis: identification of the teaching and learning activities that are to be included, costing these activities, and the transformation of these costings into a funding formula for schools. Each of these aspects have been discussed below.

Step 1: Quantification and costing of staff time

In order to cost identified teaching and learning activities it is necessary to map them onto specific kinds of resources, the most important one in education being staff. Thus identifying and costing staff activity is a core part of activity-led funding analysis. This activity often has great value in its own right and need not necessarily be seen only as part of the development of an elaborate funding formula. For example, some education authorities in the United Kingdom prior to the construction of Local Management of Schools formulae,

employed these approaches in order to determine the staffing establishments of schools according to their size and age range (West and Pennell, 1994).

The quantification and costing of staff time includes not only the activity of teaching a class but also other activities that teachers need to undertake in order to support classroom teaching, provide for the welfare of students, and manage the school. How these activities additional to teaching are classified and assessed in terms of time required varies since these assessments depend on current practice, current funding constraints, and professional judgement. The costs of non-teaching staff required to support educational activities should also be included in this analysis. These approaches can be used to allocate staff of different kinds to schools in systems where schools do not have delegated budgets for staffing. In such cases there is no need to cost each school's staffing allocation, though the cost of the staff at the level of the education authority clearly has to be known for budget generation and accountability purposes.

Step 2: Quantification and costing of non-staff resources

The second step in activity-led funding analysis is to quantify and cost all of the non-staff resources required to support specified teaching and learning activities. This approach is an application of costing techniques used by accountants (Carr, 1994). It is a technique more attuned to promoting efficiency than the traditional method of costing an organization's inputs directly without considering how they are deployed to produce the organization's outputs. Costing activities is closer to costing outputs than is costing inputs alone.

Step 3: Calculation of per-student costs and the generation of a funding formula

The final stage is to derive a funding formula from the per-student costs of the teaching and learning activities which the schools are being funded to provide. The costs per-student at different grade levels determine the coefficients attached to the student indicators in the funding formula. Or put a different way, the grade-weighted student costs determine the cash allocations per student by grade level. It should be made clear at the outset, that while certain assumptions about the way schools should or do organize teaching and learning are made in order to derive the assumed per-student costs, under systems of delegated budgeting the schools are not required to allocate resources in the same ways as assumed for the purposes of constructing the funding formula. Only if the funding

agency wishes to be directive, for example in stipulating a class size limit or minimum number of teaching hours, will this be the case.

Historical development of activity-led funding

(a) Developments in the United Kingdom

In the United Kingdom, investigations into activity-led funding approaches that had been applied in the early 1990s by some local education authorities revealed that these approaches were developed out of 1980's activity-led staffing models. These had been designed to replace the use of a traditional student/teacher ratio for determining the staffing establishments of schools with a method which took account of the interrelated impact of curriculum content and class size on the number of teachers required (Audit Commission, 1986; Simpson, 1987).

In the mid-1990s, the development of activity-led funding models was spurred on by the need to reform school funding formulae which had been largely constructed to reflect historic practice in resourcing schools. In the United Kingdom, the imposition of a national curriculum and national testing programmes and increasing government expectations that all schools should perform to national standards has given rise to greater demands on staff time and to increasing acknowledgement that the per capita funding needs of primary students are similar to those of secondary students, rather than lower, as delivered by historic funding practice.

For England, therefore, it is possible to draw on a number of national-level reports on activity-led funding as well as on the working papers of a number of local education authorities, to examine the key issues in constructing activity-led funding approaches. One of these examples, from Cambridgeshire Local Education Authority (LEA), will be discussed later in the chapter.

(b) Developments in Australia

Australia provides a different example but with similar conclusions. Interest in activity-led funding expanded rapidly in the mid-1990s when the movement towards decentralization of school management was taking off – especially in the State of Victoria, which took the lead in this area. At that time, the historical analysis of school funding revealed that there were different policies and procedures in resource allocations to primary and secondary schools. According to the Report of the Education Committee on the School Global Budget (SGB) in Victoria (1995), there were "different bases for allocating staff to schools and different working conditions that

have evolved over the years which allow less face-to-face teaching for a secondary teacher" (p. 14). These practices resulted in substantial differentials in resource allocations between primary and secondary schools, and over time had become institutionalized.

Data compiled by the Australian Ministerial Council on Education, Employment, Training and Youth Affairs, and reported in the above-mentioned Report, revealed that "per student expenditure for secondary [was] higher than for primary with the rates of secondary to primary in 1992-93 being 1.46 for Australia" (p. 14). After reviewing these data and after conducting its own activity-led funding analysis, the Committee in Victoria outlined two components for the generation of a School Global Budget: one was designed to reflect student learning characteristics and the other included priority curriculum programmes. The first component of the School Global Budget in Victoria represented two parts: the core funding which was a per-student allocation based on grade-level differentials and reflecting needs-based cost variations; and funding based on student specific characteristics.

To arrive at the formula for the core funding component, the Committee in Victoria commissioned case studies of resource allocations in schools. These case studies utilized an activity-led funding analysis approach to arrive at (i) cost per student for primary and secondary schools, (ii) cost per student by grade level, (iii) cost per student by 'object' of expenditures (teaching staff costs, other staff costs, and various non-personnel costs) and by 'purpose' (instruction, administration, student welfare services, travel etc.), and (iv) cost per student per area of the curriculum by grade level. The analytical approach for these case studies was developed by one of the authors of this chapter and used for further research by the Committee to make its recommendations on per student funding. The approach was concerned with an investigation of the actual internal allocation of resources within schools. Its main concerns were common activities within schools – and it did not cover curriculum enhancement programmes, student factors, or school site factors. For this reason, the approach is very suitable for the development of the 'basic student allocation' component of a funding formula that is concerned with total school enrolment and adjustments for grade-level differentials.

Two case studies: Victoria, Australia and Cambridgeshire, United Kingdom

In obtaining data for activity led analysis two approaches may be employed. First, data may be obtained from ***actual practices*** in schools (the approach used in Victoria). Second, data may be

obtained from professional assessment of ***desired practices*** (the approach used in England by Cambridgeshire Local Education Authority).

It is important to note that the first approach provides per-student costs for an existing form of educational provision and therefore may reflect historical practices which have no logical basis and are now thought to be inappropriate. The second approach needs to be tempered with a little pragmatism because over-zealous requests for educational provision may lead to budget requirements that are beyond a government's capacity to pay.

Case study 1: Activity-led funding analysis based on 'actual practice' in the schools of Victoria, Australia

The approach to activity-led costing and funding based on 'actual practice' that was devised in 1994 for Victorian schools is presented below. This approach derived per-student grade-level costs by examining the actual deployment of resources within schools (Abu-Duhou, 1996). The primary purpose of this research was to guide policy on core funding in the School Global Budget – and was the first such study ever conducted in Australia.

The analysis examined the functions of various resources (staffing and otherwise) and the costs of these in producing the required teaching and learning activities in Victorian schools. This necessitated an examination of how and where available resources were allocated, with the first task of the analysis being to identify the main teaching and learning activities of each school. All other expenditures such as administration, building operations, and grounds maintenance were indirect costs and were attributed to tuition activities at the grade level on a pro rata basis.

(a) Defining and identifying teaching and learning activities

The first step in activity-led funding analysis is to determine the scope of the teaching and learning activities needed to provide the required curriculum. These activities are linked directly with curriculum offerings and with the organization of these offerings. The scope of teaching and learning activities needs to be examined on a school-by-school basis because schools differ across countries and within countries with regard to teacher management, administrative staff functions, curriculum offerings, programmes, and the organization of students. Even when the profile of teaching and learning activities seems similar across several schools it is often the case that there are major differences in the resource allocations that are made to various activities within schools, and also substantial

differences in the characteristics of students which impact upon costs. The main activities of teachers fall into the following two distinct categories.

(a) Face-to-face tuition. This is time spent by teachers in class teaching for timetabled lessons that deliver the regular curriculum. (This includes only regular and timetabled teaching – but excludes relief teaching to cover for the absence of the timetabled teacher).
(b) Non-face-to-face teacher activities. This is non-face-to-face time used to support tuition and provide other learning activities. This is the most difficult part of teachers' activities to define and identify. What is included will vary among education systems and among types and phases of schools within a single system. One major element of these activities is tuition support time. This includes administration and planning time (for example, lesson planning, assessment of students' work, grade or subject-group supervision for secondary schools, classroom supervision for classroom teachers in primary schools, and subject co-ordination at both the subject level and the area of study level). The other group of activities covers duties other than regular teaching performed by teaching staff which are considered to be part of their workload, such as career information co-ordination, welfare co-ordination, school magazine, computers, library, relief teaching, professional development, drama, music, photography, pastoral care, and other administrative duties.

It is difficult to specify an exhaustive list of activities for a professional occupation like teaching where some activities are undertaken on a voluntary basis outside working hours (for example, professional development). However, the activities that are included in an activity-led funding analysis are those which are contractual activities either in law or for the purposes of the analysis. How non-face-to-face tuition activities are classified and identified depends on current practice, current funding constraints, and professional judgement. It is therefore necessary to examine the tasks performed by teachers and, for calculating indirect costs, the activities of principals and deputy principals.

To specify the actual activities carried out by teachers, timetables for schools need to be examined. This procedure identifies the amount of teaching in each area of study offered in the school. In Victoria most teaching activities and resource allocations are organized along eight lines of study: arts, English, health and physical education, languages other than English (LOTE), mathematics,

science, studies of society and environment (SOSE), and technology. These subjects are provided to students in all schools, though the amount of time devoted to each subject differs by grade level.

For a full analysis the activities of non-teaching staff must also be identified. The physical resources required to support educational activities (for example, books and equipment) should also be included. Most of these resources can be related to particular areas of the curriculum which they support. As some subjects are more resource intensive than others (for example, art and technology) the content and balance of the curriculum will affect unit costs.

(b) Estimating teaching staff time

The next step is to estimate the amount of staff time required for each identified activity over a school year. Face-to-face tuition (class teaching) in a school year is normally timetabled or organized in cycles of one week, with each week consisting of a number of periods offered for each grade level and for each subject. In some schools, a cycle of teaching is repeated at different intervals than a week, and therefore it is important to identify the length of the cycle and how many times it is repeated in a school year. For each cycle it is necessary to identify the number of face-to-face tuition periods which are provided for students. In the final analysis, the number of tuition periods per scholastic year offered in any grade level is fixed. This is considered the contractual teaching time per year to be provided for each student (excluding students with supplementary educational needs). In the example shown in *Figure 4.1*, there were 40 cycles a year in Victorian schools, 25 periods a cycle for primary schools, giving 1,000 tuition periods a year for primary students compared with 1,200 for secondary students.

When the cyclical structure of the programme has been established, it is necessary to establish how many face-to-face teacher hours are required to deliver the number of periods per year each student is contracted to receive. This depends on the number of students and the average class size in which they are taught. The more students and the lower the class size the more teacher face-to-face hours are required for staffing a given number of student class periods a year. Usually some subjects are taught in smaller classes than others (for example, practical and laboratory classes in science and technology for safety reasons). The more options offered to students the smaller will be the average class size for a given number of students. Therefore the number of teacher tuition hours required will depend on the balance of subjects and the organization of the curriculum.

Figure 4.1. General programme organizational arrangements for primary and secondary schools in Victoria, Australia

General details

All schools work on a one-week cycle

Number of weekly cycles per year	40 cycles
Number of secondary class periods per day	6 periods
Number of primary class periods per day	5 periods
Number of secondary class periods per cycle	30 periods
Number of secondary class periods per year	1,200 periods
Number of primary class periods per cycle	25 periods
Number of primary class periods per year	1,000 periods

Teacher outputs

Total output for a full-time primary classroom teacher: 25 periods per cycle.

Total tuition support allocated to primary teachers for administration and planning time (APT): 3 periods per cycle.

Total output for a full-time secondary classroom teacher: 30 periods per cycle.

Total tuition support allocated to secondary teachers for administration and planning time (APT): 7 periods per cycle.

In the Victoria study detailed information on this was obtained from schools to calculate the number of face-to-face tuition hours provided in total to all students differentiated by grade level. Because secondary schools had more subject specialism and wider subject choice they required more teacher face-to-face tuition time per cycle than did primary schools for a given number of students.

For the purpose of using a per-student annual cost for face-to-face tuition according to grade level in a funding formula, there is no need to show the details of the curriculum organization. However, if a funding agency wishes schools to provide more time for workshop or laboratory based subjects or greater curricular choice to students, it has to reflect this in a higher cost per student otherwise schools will either not comply or shift resources from elsewhere.

Estimating non-face-to-face tuition time is more difficult since such activities are more varied and the time that they should take is not always specified in teachers' contracts or in informal arrangements within schools. Another factor which must be taken account of is when the activity takes place. Some non-face-to-face teaching activities have to take place during the school day (for example, student welfare work, relief teaching, lesson observation), others after the school day (for example, parental consultations) and others at either time. Teachers are usually given some non-face-to-face time

within the school day. As shown in *Figure 4.1*, teachers in primary schools in Victoria were expected to provide 25 periods per week for teaching and learning activities. Out of the 25 periods per week for each full-time equivalent teacher, the designated face-to-face teaching load was 22 periods per week, with 3 periods for administration and planning time, lesson preparation and assessment. Secondary-school teachers were expected to provide 30 periods per week for teaching and learning activities. Out of these 30 periods per week for each full-time equivalent teacher, the designated face-to-face teaching load was 23 periods per week, with 7 periods for administration and planning time and/or lesson preparation and assessment.

The analysis of activities reveals that certain duties carried out by teachers reduced their face-to-face teaching load. These activities included the co-ordination of classroom teachers in primary schools and grade-level co-ordination in secondary schools, careers counselling, student welfare, school magazine, computers, library, relief teaching, professional development, drama, music, photography, pastoral care, and other administrative duties. Hence, for some teachers in primary schools their face-to-face teaching loads were far less than 22 periods per week when all of their duties were added together to form 25 periods per week. Similarly, a number of teachers in secondary schools did not teach 23 periods per week when all their duties were added together to form 30 periods per week. The final division of a teacher's time among various activities is school specific, while the total time devoted to teaching and learning are contractual times.

A further issue to take into account in activity-led funding analysis is that some non-face-to-face activities depend on the number of tuition periods (class periods) a teacher has per cycle rather than on the number of students. Examples are lesson preparation, professional development, subject co-ordination. Other activities are directly generated by student numbers, such as assessment and reporting to parents.

In the Victorian analysis a simplifying assumption was made that all teaching and learning activities are generated by the number of face-to-face class periods. This assumption was made so that the smallest unit for generating activities was taken to be the face-to-face class period. Thus each face-to-face class period generates face-to-face teacher tuition time and, in addition, non-face-to-face teacher activity time. This means that if the number of students increases but they are accommodated within existing classes so that the number of classes remains the same, then the amount of teacher time required per school year is also unchanged. Alternative assumptions are quite feasible, provided one is prepared to make the analysis more complex by classifying non-face-to-face

activities according to whether the time required for them depends on the number of teachers, the number of 'different' classes taught, the number of students, and whether the activity takes place during or outside the school day.

(c) Estimating non-teaching staff time

Non-teaching support staff time also needs to be included in an activity-led funding analysis. School systems vary greatly with respect to the numbers and categories of non-teaching staff employed in schools. Some staff are employed directly in supporting teaching and learning (for example, classroom assistants, laboratory assistants, technicians) and are part of the direct costs of teaching and learning. These costs can be attributed to particular curriculum areas and grade levels.

Other non-teaching staff provide managerial and administrative services. This category of staff includes the principal and deputy principal, clerical and office staff, bursar, and administrative duties performed by teaching staff essential for the running of the school rather than for the provision of teaching and learning for the students. The activities provided by these staff are identified as 'administrative support staff' because they are essential for the functioning of the school as an institution. In addition, schools employ staff to carry out specific functions, such as student welfare coordinator, counsellors, psychological career advisers, nurse, integration aides, and so on.

The duties and responsibilities of these staff may be highlighted in the contractual arrangement between the school and the funding agency, or may be defined by the school. For funding purposes, however, the costs of these activities are part of the basic student allocation coefficient in the funding formula. However, if the unit costs vary by type or size of school then it is appropriate to allocate funding for all or part of these costs in relation to other variables than student number (see later chapter).

(d) Including external fixed parameters

The next step in activity-led funding analysis is including in information on externally determined factors or parameters which affect costs but which have to be taken as a given for 'costing purposes'. Such externally given parameters usually include teachers' and non-teaching staff salaries and employment conditions, number of hours worked, health and safety regulations, length of school day and school year, and so on. These matters need to be recognized and, when appropriate, used in the calculations.

(e) Establishing per-student teaching costs

Having identified teaching and learning activities, staff and non-staff time, and external fixed parameters, the next step is to cost teaching time and derive per-student costs. A detailed analysis allows the formulation of per-student costs in several ways: by grade level, by curriculum area, by 'object' of expenditure (teachers costs, other staff costs, and various non-personnel costs), by 'purpose' (instruction, administration, student welfare services, travel etc.), and, finally, the cost per student per area of study by grade level.

Considering the assumptions and the analysis made above, the coefficient for teacher costs attached to the student indicator in an activity-led funding formula may be derived from the variables shown in *Table 4.1*. The table shows the information required for deriving the teacher cost per student with illustrative figures. Only the least-cost grade level (year group or age range) is illustrated and it is assumed that schools are of minimum efficient size so that they can organize teaching on the basis of assumed class size. Different teacher costs can be worked out for smaller schools, making specific assumptions about the teaching group sizes required in order to deliver the curriculum.

Of these variables, $\mathbf{N_j}$, the average class size, represents a policy variable which could be manipulated at the school level to achieve economies of scale with respect to teacher costs. Alternatively, class size may be fixed by national policy, for example, around 25 students is the assumed primary class size in many education systems. The subscript **j** stands for grade level and takes the values (P , . . . , 12), where P is the first grade of schooling.

$\mathbf{X_{1j}}$ equals the number of weeks a year for which students are taught times the number of hours a week a class is taught. The subscript is used to allow for policy decisions to change the number of periods taught per group of students in a grade level. From the analysis provided above and from *Figure 4.1*, as an example, $\mathbf{X_{1j}}$ equals 1,000 for primary schools or 1,200 for secondary schools. Here the assumption is that each period lasts an hour.

$\mathbf{X_{2j}}$ is the number of teacher hours required for supporting teaching and learning per $\mathbf{N_j}$ students per year. This is a very complex variable for it includes all non-face-to-face tuition activities required to give direct support teaching and learning in one grade or class of size $\mathbf{N_j}$ per year. Given the assumption about the class period being the smallest unit of analysis, the time involved here varies with the number of classes taught. $\mathbf{X_{2j}}$ differs from one school system to the next but at the same time differs within the education sectors in the same country. The actual value for $\mathbf{X_{2j}}$ in most primary schools in Victoria depends on whether the class is operating with a classroom teacher and part use of a specialist teacher, which in turn

80

Table 4.1. Description of variables used for calculating the teaching cost coefficient for the funding formula and a worked example

Variable name	Variable description	Assumed numerical value of variable
N_j	The average class size in which students in grade j are taught over the range of areas of studies and/or subjects in the curriculum.	25 students per teaching group
X_{1j}	The number of teacher hours a year required to teach a class of assumed size (N_j). This is the number of weeks/cycles a year for which students are taught times the number of hours a week/cycle a class is taught.	1,000 hours (25 hours per week times 40 weeks)
X_{2j}	The number of non-face-to-face teacher hours required for supporting teaching and learning per N_j students per year.	900 hours
X_3	The total number of hours a year for which teachers are contracted to work.	1,400 hours
X_4	The number of hours a year in which teachers are contracted to teach classes.	760 hours
X_5	A notional annual average salary of a teacher including on-costs (such as, national insurance, pension contributions, etc.)	$30,000

depends on the size of the class. It also depends on those activities asked of teachers, such as communicating with parents, which vary with the number of classes taught, and hence with the number of teachers. In secondary schools, however, it is more complicated for it also depends on the subjects taught which in turn increases the amount of administration and planning time per student. The example in *Table 4.1* assumes that the analysis above has been done and that 900 hours of teacher time a year (from different teachers) are required per class of 25 students.

X_3 is the contractual time, which is the total number of hours a year for which teachers are contracted to work for the activities included in the analysis. This is set for any one school system.

As noted earlier, the smallest unit for resource allocation to teaching and learning is the class period. The teacher's time generated by a class of size N_j is put on a per-student basis by dividing through by the number of students per class to give the fraction of a teacher's time required per student. Taking the example in *Table 4.1*, the cost of teacher time per student is:

(the fraction of a teacher required per student) * (the annual average salary cost of a teacher)

The fraction of a teacher required per student in grade level **j** is:

$$(X_{1j} + X_{2j})/(X_3 \times N_j) = 1900/(1400 \times 25) = 1.35/25 = 0.054$$

In this example 1.35 teachers on average are required to provide teaching and support activities to an average class size of 25, which is 0.054 teachers per student. Assuming a teacher on average costs $30,000 a year, the per-student cost for teachers is $1,620. This is the value of the coefficient used for costing the teaching and learning activities resulting from the allocation of teachers' times. This coefficient may be assumed to be fixed for all grade levels, or to vary from primary to lower secondary to upper secondary. Clearly, this coefficient varies with any changes that may occur in class size, teacher salaries, and time allocation for both tuition and tuition support per grade level. That is, any grade-level differences would be reflected in different assumptions about class size, teaching hours, and non-face-to-face support activities to produce a different coefficient for teaching costs.

(f) Establishing other per-student direct costs

The resources other than teachers required to support teaching and learning, need to be costed on a per-student basis in order to derive a coefficient for the funding formula. Non-teaching support staff time needs to be costed on the basis of the salary costs of the staff involved and then put on a per-student grade level basis.

The costs of providing curriculum support resources are relatively easily costed once they have been identified. Some examples are: consumable items for class use, books, slides and audiovisual aids for classes, class materials, teacher references and requisites, photocopying and duplicating for these subjects, maintenance and repairs of equipment used in these subjects, and excursion costs

related to this area of the curriculum. Most curriculum support costs are related to areas of study and can be appropriated to each grade level.

(g) Establishing per-student indirect costs

All other staff and non-staff costs of managing and administering a school, and operating the school buildings, can also be costed as a per-student amount. Administrative services support is a term used to refer to all overheads consumed by the school in order to function as an organization. The management and administrative staff time identified in earlier steps must be costed in relation to salary costs. Also included are all goods and services essential for the running of the school, such as office requisites, office copy costs, telephone costs, office furniture, postage, telephone, electricity, gas rates, staff travel, bank charges, insurance, photocopying for the school (not subject specific), advertising, audit fee, and other administrative staff hired on a casual basis. These costs are school specific and are related to school size, programmes, and other needs.

Maintenance and repairs, minor works on school buildings, and cleaning costs are also indirect costs. This category is also school specific and depends very much on the age and the condition of buildings and grounds. These costs are considered in a later chapter.

If building costs are delegated to schools they may be allocated in the funding formula in relation to size of building or student numbers or in relation to other school-specific factors. The indirect costs are attributed to students when these can be either per capita or in relation to grade-level weighted student numbers. Which is more appropriate depends on whether it is judged that students contribute equally to administrative costs whatever their grade level, or whether it is considered that some grades (for example, older students transferring to the next stage of education) require more administrative services, or building space. These costs are appropriated to various grade levels on the basis of enrolments in the grade level, and they become part of the per-student coefficient in the funding formula.

An example from Victoria

An example of the results of an activity-led funding analysis for one primary school in Victoria during 1993 is presented below. This primary school had 199 students in seven grade levels: 38 in prep, 28 in grade one, 31 in year two, 24 in year three, 27 in year four, 24 in year five, and 27 in year six. The school had a teaching staff of 13 teachers (12.9 FTE), and specialist staff including 0.6 for the library, 0.2 for music/mathematics, 0.3 art, and 0.2 science. In

addition, it had a non-teaching principal, and one full-time clerical assistant. The school had developed a comprehensive system of programme budgeting which showed the budgets for each area of study. The allocation of teachers' time to tuition and non-tuition activities was achieved through careful examination of the time-table, the curriculum organization, and teachers' allotments. Given the distribution of teachers' loads to the eight curriculum areas for each year level and to administration and tuition support duties, the school was offering 265 periods per cycle. Of these, 225 periods were considered face-to-face teaching, and 40 periods per cycle were for duties other than face-to-face teaching (tuition support and administration and planning time). After adjustments for class size, the total per-student costs were distributed as shown in *Table 4.2*. The value of the coefficient for each grade level has been presented in the last line of the table. The weighted average cost for the school was $3,399, as shown in the last cell of the last line in *Table 4.2*.

The figures in *Table 4.2* indicated that the average total per-student cost for this school was $3,399. However, there were marked variations in per-student costs by grade level – due to both class size and level. The value of the coefficient was .$3,009 for Grade 6 students, considerably lower than the figure of $3573 for Grade 1 students.

When tables, such as *Table 4.2*, have been prepared for a sample of schools, it is possible to establish average financial inputs for each grade level in the system. These average values are the figures that are employed in preparing a funding formula for a whole school system. Again, it must be emphasized here that the approach adopted in Victoria referred to an activity-led funding analysis for 'actual practices' (as distinct from 'desired practices').

In the earlier chapter on 'principles' of formula construction, it was noted that basic per-student allocations were often made (a) on a per-student basis, and (b) differentiated by grade level. This second part of the allocation is sometimes made by grouping sets of grade levels together. A common distinction in differentiating funding is among early years, later primary grades, lower secondary, and upper secondary. For schools which are below minimum efficient size and therefore incur higher per-student costs, the activity-led funding model can be used to calculate what additional costs are appropriate for smaller class or teaching group sizes. These adjustments would be allocated as part school site costs.

For example in Victoria, indexing costs for teaching and learning against the weighted mean for all grade levels was $2,521. This overall weighted mean was close to the mean for Grade 8 of $2,478. When indexed against Grade 8, values ranged from 0.60 for grade 5 to 1.66 for Grade 12. These differences were associated with different class sizes at the upper grade levels, which were related to

Table 4.2. Per-student funding distributed by grade level and activity for a single school in the state of Victoria, Australia (dollars per student)

Type of activity	Grade $							Average $
	P	1	2	3	4	5	6	
1. Teaching and learning								
(a) Teaching staff	1 576	1 825	1 804	1 585	1 795	1 657	1 380	1,671
(b) Support staff	239	314	330	330	330	330	199	294
Subtotal	1 815	2 139	2, 34	1 915	2 125	1 897	1 579	1,965
2. Curriculum support	39	52	47	60	54	60	56	52
3. Management and Administration: staff	460	613	557	707	639	712	657	608
4. Management and Administration: non-staff	577	769	754	889	909	890	717	775
Value of coefficient	2 891	3 573	3 492	3 571	3 727	3 649	3 009	3399

curriculum offerings and ranges of subjects offered. It was also related to the lower amounts of face-to-face teaching by secondary-school teachers, which again was linked to the diversity of subjects and activities performed by secondary-school teachers over and above their face-to-face teaching, and with the type of internal organization of the school itself and the distribution of teachers' loads.

Case study 2: Activity-led funding analysis based on 'desired practice' in the schools of Cambridgeshire, United Kingdom

Cambridgeshire Local Education Authority (LEA) in the United Kingdom was one of the first LEAs to introduce Local Financial Management (LFM). From 1982-1986, seven schools (six secondary comprehensive schools and one primary) piloted 'local management'. This meant that the schools were given a lump-sum cash figure and allowed to use it in whatever way seemed appropriate to the particular needs of the school, as interpreted by the headteacher (Principal) and the governors (School Council). The schools had to pay virtually all the costs of running the school, except major structural repairs and improvements requiring capital expenditure. The deployment of resources among teaching staff, non-teaching staff, teaching materials, internal maintenance and repair was at the discretion of the school itself.

Although this approach to the management of schools was not rigorously evaluated in terms of its impact on student achievement, it was felt to be 'successful' in so far as it gave greater flexibility of management at site level, encouraged efficiency, and stimulated entrepreneurial activities for increasing school income, which each school was allowed to keep in full. The basic principles of the Cambridgeshire scheme were taken by central government and developed into 'Local Management of Schools' (LMS), which became the national pattern after the 1988 Education Act.

The activity-led staffing project

Towards the end of the 1980s and into the 1990s, attention in Cambridgeshire switched from the deployment of resources at school level to the issue of the generation of resources at LEA level. In brief, on what logical basis was the LEA generating its education budget and allocating it to schools and what volume of service did the politicians (county councillors) think they were funding? To understand this question more fully with a view to moving towards a rational generation and distribution of resources, the LEA set up working parties, the membership of which was drawn both from the LEA officers (administrators) and from practitioners (Principals). This dialogue had been well established

in the earliest days of LFM. In the later stages of the project, the working parties included representatives from both the primary and secondary sectors; this helped to overcome misunderstandings, reduce special pleading for sector interests and give greater consistency to the whole model.

The aim of the Activity-Led Staffing (ALS) project was to create a model for primary and secondary schools within which teachers' duties and activities could be defined in terms of:

- basic teaching requirements;
- special educational needs;
- cover for absence of teachers and preparation of teaching materials;
- recording and assessment of student progress; and
- management tasks.

For each part of the model, formulae were developed to calculate the number of teacher hours which, according to professional judgement, were required under each heading on a school-by-school basis. The parameter figures used within the model produced the total number of teacher hours required in each school. This was then converted into a full-time teacher equivalent (FTE) count through the use of divisors. The numbers of teachers required per school were then aggregated to form a total teacher requirement for the primary and secondary sectors. The cost of providing the teachers was then determined by multiplying the teacher total by the average teacher salary. At this stage, the LEA officers and elected members were in a position to see whether or not the LEA budget, mainly determined by central government, could or could not afford to provide that many teachers. If the 'target parameters' within the model produced a teacher requirement greater than the budget would allow, they were modified to become 'best-fit parameters'. This process enabled everybody (Principals, School Council, LEA officers and politicians) to see exactly what the LEA budget was able to provide in terms of volume of service to students.

The recommendations of the working parties were scrutinized by external consultants (Coopers and Lybrand), as a result of which significant changes were made to the methodology of calculating the number of teachers required.

It must be stressed that, although the ALS model was used to generate and distribute funding to schools, the deployment of resources at school level remained within the discretion of the site-based team. If the parameters within the model indicated, say, a class size of 27 students for Grade 7 students, there was no requirement for Principals to organize the school with classes of that size. The main principle of LMS, site-based decision-making, remained sacrosanct.

Producing the model and the parameters

(a) Basic teaching and learning requirements

The basic teaching and learning requirements were expressed in the primary phase in terms of the number of students per class, the hours per week and the weeks per year. Careful consideration was given to the issue of class size maxima because the numbers of students in a cohort tends to vary year by year. The use of rigid maxima, for example 30 students per class, would have produced a teacher requirement way beyond the budget. It was therefore assumed that there would be flexible, mixed-age, vertical grouping in the primary sector but priority was given to reception classes (four-year olds entering school before statutory age) to ensure that they were kept small. In the secondary sector, the model was more sophisticated in so far as it took into account the needs of the different specialist subjects (science and technology, for example, must be taught in smaller groups for health and safety reasons), the expectation that older students (14-16 year-olds) would be given some options within the overall requirements of the National Curriculum (which was being established at the same time as this project was under way), and that post-16 year-old students would continue the peculiarly English tradition of being taught in small groups, but for a smaller number of hours per week.

'Pastoral time' was added for both phases. This is the time taken up each day in class-based non-curricular activities or in assemblies (given the United Kingdom requirement that all children should engage in an act of collective worship every day).

(b) Special educational needs (for non-statemented students)

A funding allocation was made to help the school meet the 'special needs' of those students who were <u>not</u> 'statemented'. The statementing process is intended to provide specified additional resources to named individuals (2 percent of the population) who suffer from a major physical or mental handicap. In addition, a further 18 percent of students need some form of extra help, usually in the form of individual tuition, and this is to be provided from within the staffing resources allocated to the school. This figure was defined in terms of minutes per student per week.

(c) Cover for absence of teachers and lesson preparation

An allocation of time was made to allow for the fact that United Kingdom teachers are expected, as part of their contract, to provide

cover for absent colleagues, within specified limits. This is more easily organized in the secondary sector than in the primary sector, where most teachers are fully occupied with their own class all week. Traditionally, secondary teachers have been given more non-contact time (a source of some controversy) but in practice about 30 percent of that non-contact time is taken up in providing cover (whereas in the primary sector, cover will be provided by using a supply teacher). This figure was expressed as a percentage. That is, the time requirement generated by the basic requirement factor was increased by 15 percent.

(d) Recording and assessment of student progress

The introduction of a National Curriculum in the United Kingdom has brought with it much tighter regulations in terms of assessment and recording of student progress. In the summary tables, this is shown as a per-student allocation for Standard Assessment Tasks (for particular grades) and Records of Achievement (for all students).

(e) Management tasks

By far the most difficult, and perhaps the most innovative, aspect of the Cambridgeshire ALS project was the attempt to quantify the time taken by teachers on management and administrative tasks. After a number of trials and drafts, the management tasks of a school were divided into 16 categories (with sub-divisions in many cases). These were:

(i) *Appointment of staff*. In United Kingdom schools, staff were appointed by the individual school and the usual practice was for a number of school staff to be involved in the selection process.
(ii) *Management of staff*. This covered departmental and pastoral team meetings, as specified under teachers' contractual conditions, and internal communications.
(iii) *Liaison with staff unions and associations*.
(iv) *Curriculum*. Care was taken not to double-count the meetings referred to in item (ii) above. Curriculum included guidance to students on option structures and vocational pathways.
(v) *Review of standards of teaching and learning*. This did not include the time needed to prepare for inspection under the national system (OFSTED) which took place every four years, now amended to every six.
(vi) *Training and development of staff*. This included the statutory five days per year within the directed time of the teacher's

contract and other professional development, together with the management of it.

(vii) *Management information*. This heading included the time taken by senior staff spent on writing references for colleagues applying for posts elsewhere.

(viii) *Student progress*. A large heading which covered all the administrative processes of student admission and departure, examination entries, and liaison with staff on student progress. This category revealed significant differences between the primary and secondary sectors.

(ix) *Pastoral care and discipline*. This heading was not easy to define in terms of minutes per student per week. It included the time that teachers are required to spend on formal supervision of students before school, at break and after school, but not at lunch-time, which is funded separately.

(x) *Relations with parents*. This referred only to statutory links (for example, parental consultation evenings) and did not include voluntary involvement of teachers with parent teacher association activities.

(xi) *Relations with other bodies*. This covered the time spent, mainly by senior managers, in working with the Local Education Authority (LEA), media, local community, etc.

(xii) *Relations with the Governing Body (School Council)*. During the time of the project, there was a massive increase in the involvement of governors in the running of schools and an attempt was made to quantify the amount of time spent on the management of this process.

(xiii) *Relations with authority*. This covered the time taken on completing official returns for the LEA and for the central government Department for Education and Employment (DEE).

(xiv) *Relations with other educational establishments*.

(xv) *Finance and resources*. This included the time spent by senior managers on financial control systems.

(xvi) *Premises*. Since the implementation of LMS, senior staff have had to spend some time on monitoring the state of the premises, with the practical help of non-teaching staff.

Data were acquired under the above headings from a large sample of schools. Although there were some areas of doubt in terms of interpretation (for example, in some larger schools, many of the administrative tasks traditionally dealt with by teaching staff had been allocated to less expensive non-teaching staff), figures were generated which suggested a per-student allocation in the primary phase and, in the secondary phase, a 'lump sum' of time irrespective of student numbers, with a top-up according to the number of students on roll. A distinction was also made between student-

related and teacher-related management activities. The more teachers in a school, the greater the amount of time needed to manage them effectively.

Converting the time requirements into teachers

Having arrived at the number of teacher hours required for all of the activities defined above, the next task was to convert these into actual teachers. Teachers in the United Kingdom are required by contract to work for 1,265 hours of 'directed time'. That is, the Principal can specify how and where these 1,265 hours per year are spent. The legal document specifying the teachers' contractual commitments expects that teachers will spend more time than that outside (or inside) school on personal preparation. The 1,265 hours are only the hours for which a teacher must be available for specified work.

The first issue to tackle was whether or not to include the time of the Principal and Deputy Principal(s). Whereas in many education systems, the Principal is seen as having a purely administrative role, the United Kingdom tradition is for principals and deputies to undertake some teaching as well as having a management role. Indeed, in most primary schools, the Deputy will also be a class teacher. At the same time, it is customary in United Kingdom schools for many management and administrative tasks to be shared among a number of senior teaching staff, who receive financial enhancement (responsibility points) for this work. Agreement was eventually reached to include the Principal and Deputy in all the calculations, even though the 1,265 hours contractual figure does not apply to principals and deputies. It is assumed that in their work, however, many hours are needed to fulfil their responsibilities. Independent national surveys have shown that, during term-time, principals work on average 60 hours per week, giving a full-year equated workload of 45 hours per week.

In the early stages of the project, the working party simply divided the aggregate number of hours required per school by 1,265 to produce the number of teachers required. The external consultants pointed out the flaw in this process. The activities as analyzed above fall into three categories:

(a) those which must be carried out 'in school-time hours' because the students are directly involved;
(b) those which must be carried out when students are not present (for example, staff meetings) during 'out-of-school-time hours'; and
(c) those activities which could be carried out at any time.

An example will illustrate the problem. If a school's total time requirement comes out at 12,650 hours, dividing by 1,265 will produce a requirement for 10 teachers. However, if 9,900 of these teacher hours have to be carried out in 'school-time' and students are only present for 900 hours, then 10 teachers will be insufficient because they will only be able to meet 9,000 of the 9,900 hours required. Eleven teachers will be needed and the overall total of 12,650, when divided by 11, produces a per-teacher workload of 1,150 hours. Each teacher has an extra availability of 115 hours, just over 3 hours per week.

The effect of this methodological change was to increase the number of teachers required for the primary sector because a higher proportion of the activities undertaken by primary-school teachers requires students to be present. This also means that primary teachers are shown to have more directed time available outside their classroom teaching than secondary teachers.

Converting the teacher requirements into cash figures

Having calculated the number of teachers required for schools in each sector, the next step was to find out what the cost would be. A number of highly sophisticated methods were considered but ultimately a simple approach was taken. The average salary of all teachers (in each sector separately) was calculated and multiplied by the teacher requirement. The sectors were calculated separately because the average cost of a secondary teacher is higher than in the primary sector, due to the situation that secondary schools have tended to appoint more highly qualified teachers and have more responsibility points to allocate. One of the important by-products of analytical work of this kind is to provide data to re-open the debate on issues such as inter-sector differences in the management of teachers.

The unsurprising outcome of this process was that the cost of providing the required teachers was greater than the budget available! The first proposal to meet this shortfall was simply to reduce expenditure across the board by the necessary 11 percent. The politicians felt that it was inappropriate to publicize the fact that they were only funding to 89 percent of the requirement. The working party was sent back to change the parameters within the model until it produced the number of teachers the LEA could afford. The original parameters were called 'target parameters' and the revised ones became known as 'best fit'.

Target and best-fit parameters

Tables 4.3 and *4.4* show the outcomes of the process outlined above. *Table 4.3* refers to the primary sector and *Table 4.4* to the

Table 4.3. Activity-led staffing model – Cambridgeshire County Council primary schools 'target' and 'best-fit' parameters

Parameters	Target	Best-fit
Basic teaching requirements (nursery/reception)	1 : 24	1 : 28
Basic teaching requirements (years 1–6)	1 : 27	1 : 35
Teaching year	38 weeks	38 weeks
Teaching hours (reception and years 1–2)	21 hrs/wk	21 hrs/wk
Teaching hours (years 3–6)	23.5 hrs/wk	23.5 hrs/wk
Pastoral time	20 mins/day	20 mins/day
Directed time	1265 hrs/tchr/yr	1265 hrs/tchr/yr
Special educational needs	18% of popn.	18% of popn.
Learning support factor	20 min/student/wk	18 min/student/wk
Cover for absence and preparation	15%	10%
Proportion of above during school time	40%	40%
Assessment: during school time		
Standard assessment tasks KS1	1.4 hrs/student/wk	1.4 hrs/student/wk
Standard assessment tasks KS2	1.4 hrs/student/wk	1.4 hrs/student/wk
Record of achievement	0.75hrs/student/wk	0.75hrs/student/wk
Assessment: During other directed time		
Teacher assessment of students (record keeping)	1.6 hrs/student/wk	1.6 hrs/student/wk
Management tasks (total)		
- Lump sum	0 hrs/yr	0 hrs/yr
- per student	14 hrs/student/wk	14 hrs/student/wk
(School Time)		
-Lump sum	0 hrs/yr	0 hrs/yr
- per student	5 hrs/student/yr	5 hrs/student/yr
(Out-of-school time)		
- Lump sum	0 hrs/yr	0 hrs/yr
- per student	3 hrs/student/wk	3 hrs/student/wk
Initial calculations		
Teaching year in hours (reception and years 1-2)	861.333 hrs/tchr/yr	861.333 hrs/tchr/yr
Teaching year in hours (years 3-6)	956.333 hrs/tchr/yr	956.333 hrs/tchr/yr
Learning support hours per SpN student per yr	12.67 hrs/student/wk	11.40
Results		
After applying the above parameters, using the Jan 96 student figures (Sept 94 base), the student number totals and the overall teacher requirement are as follows:		
Student numbers	60,932	60,932
Overall teacher requirement	3,267.27	2,605.18

Table 4.4. Activity-led staffing model – Cambridgeshire County Council secondary schools 'target' and 'best-fit' parameters compared

	Target					Best-fit				
1. Group size	Technology	Science	Languages	Other	Pastoral	Technology	Science	Languages	Other	Pastoral
Year 7	20	24	24	27	27	20	28	30	30	30
Year 8	20	24	24	27	27	20	28	30	30	30
Year 9	20	24	24	27	27	20	28	30	30	30
Year 10	18	20	24	24	27	20	24	26	27	30
Year 11	18	20	24	24	27	20	24	26	27	30

2. Teaching time %	Technology %	Science %	Languages %	Other %	Technology %	Science %	Languages %	Other %
Year 7	10	10	10	70	10	10	10	70
Year 8	10	10	10	70	10	10	10	70
Year 9	10	15	10	65	10	15	10	65
Year 10	10	20	10	60	10	20	10	60
Year 11	10	20	10	60	10	20	10	60

	Target		Best-fit	
3. General				
Contractual year	1265 hours		1265 hours	
Teaching year	38 weeks		38 weeks	
Teaching hours	23.33		25 hrs/week	
Pastrol time	45 mins/day		30 mins/day	
Special needs	18% of		18% of student pre-16	
Support time	20		20 mins/student/week	
	Pre-16	Post-16	Pre-16	Post-16
Cover for absence and preparation	15%	9%	15%	9%
Proportion of above in school time	40%	0%	40%	0%

Table 4.4 continued

4. Sixth Form hours	Teaching	Pastoral	Teaching	Pastoral
One year	20.0	2.5	20.0	2.5
Two year	17.5	4.0	17.5	4.0

5. Sixth Form groups	Teaching	Pastoral	Teaching	Pastoral
One year	15	12	18	12
Two year	10	15	12	15

	Target and best-fit
6. Special needs post-16	
Special needs	3% of students post-16
Support time	20 mins/student/week

	Target and best-fit
7. Assessment: During school	
Standard assessment task KS3	1.4 hours/student (year 11/year 10)
Standard assessment task KS4	1.4 hours/student (year 11/year 10)
Records of achievement	0.75 hours/student (all)/year 7.11))
Assessment: During other directed—Teacher assessment of students (record keeping)	1.6 hours/student (pre-16)

Table 4.4 continued

	Target and best-fit		
8. Management	Total	School time	Out of
Student related	1500	630	480 hrs/estab.
	4	2	1
	12	5	4 hrs/student (post-
Teacher related	3000	210	2040
	12	1	8 hrs/student (sic)

Initial calculations	Target	Best-fit
Teaching year in hours	886.54	950.00
Pastoral hrs/year < 16	142.50	95.00
Total 'school time' hours	1029.04	1045.00

Results	Target	Best-fit
After applying the above parameters, using the Jan 96 student figures (Sept 94 base), the student number totals and the overall teacher requirements are as follows:		
Student numbers	41,953	41,953
Overall teacher requirement	2,688.92	2,495.40

secondary. The target parameters for 1996 resulted in the requirements of 3,267 teachers in the primary sector and 2,688 in the secondary, a total of 5,955.

In contrast, the best-fit parameters produced teacher requirements of 2,605 and 2,495 respectively – which gave a total of 5,100 teachers. This represented a reduction of 855 teachers. The extra teachers would have cost over £17 million in an entire LEA budget of about £250 million, an increase of nearly 7 percent at a time when central government funding was being reduced in real terms by about 3 percent.

The best-fit parameters were used to produce grade-by-grade weightings for the teaching staff factor. These showed that, in the primary sector, Years 1, 3-5 were the cheapest, with 8 percent enhancement for reception classes and 2 percent for Years 2 and 6 (the Key Stage Assessment years). There was a step up into the secondary sector of 25 percent and then within the secondary sector, Years 10 and 11 had a 6 percent and 9 percent increase, rising to a massive 50 percent increase in the last two years of schooling, Grades 12 and 13.

Further work

The Cambridgeshire ALS model gives a formula approach to the generation of only one part of the budget for schools, albeit the most important (teaching staff costs accounting for about 80 percent of the cost of running a school). A similar approach could be taken to the other major student-related elements: non-teaching staffing; premises maintenance and internal repairs and decoration; learning resources and equipment; and public examination expenses.

Further work needs to be done on these areas where the formulae used date back, in many cases, to pre-LMS days. A great deal of professional time may be required to produce a more sophisticated model and, given the law of diminishing returns, it might be simpler to use the relativities produced by the ALS model to apply to all the student-related factors.

The Cambridgeshire model has a number of strengths:

(a) it was produced by officers and school-based practitioners working together;
(b) it revealed very clearly the issues of disparity among age groups and phases and also provided some information on why these disparities existed;
(c) it enabled officers and politicians to see what the budget was notionally providing in every school in a way which was more user-friendly than cash figures or percentage increases;

(d) it enabled any innovation to be accurately costed; and
(e) it gave all those involved in education, including parents where schools passed this information on to them, a common vocabulary with which to articulate demands for greater public investment in education.

The model could be criticized for having merely produced a clearer analysis of the status quo and for not being radical enough in tackling the interface between professional, paraprofessional and technical staff. Individual elements within the model could of course be challenged. However, the main message at a national level for this work was that there is no reason, in principle, why the same methodology could not be applied to the generation and distribution of educational funding from central government. A disaggregated and transparent model of this kind would enable a proper debate to take place about national priorities and objectives for education.

Conclusion

Compared with historical funding approaches, activity-led funding is considered to be superior in promoting educational effectiveness since the approach is derived from a detailed knowledge of teaching-learning activities and educational objectives as set down in the curriculum. At the same time it is more equitable, since funding is related to students' educational needs as determined by their curriculum entitlement and all students in the same circumstances are treated the same.

Activity-led funding models are well adapted to being used for 'what-if' analyses. For example, in analyzing the costs of reducing class size or increasing teachers' non-contract time. The costs of these policy changes can readily be estimated by changing the relevant parameters. Further, activity-led funding is responsive to change; for example, if the curriculum changes then consequent changes in resource needs can be easily analyzed.

As a research tool, it demonstrates over or under funding in historically funded systems and therefore provides a rational basis for arguing for change. The Victorian case studies mentioned in this chapter are examples in point. The studies were commissioned for the purpose of finding out how resources were allocated to primary and secondary schools. The results have shown variations in costs per student between primary grades and secondary grades, and between the upper primary and the lower secondary years of schooling. Patterns of costs per student showed high costs for grades P-2 (early years of schooling), somewhat lower costs at Grades 3-6, and

an increase for grades 7-8, 9-10 and 11-12. These differences were explained by the lower number of face-to-face teaching hours and smaller class sizes for secondary teachers, the latter related mainly to curriculum specialization and options for subject choice at this level. Also, there were very high differentials between primary and secondary for administrative support. These were consistent with historical patterns found in Australia. Hence, arguments for change were supported by evidence.

One of the disadvantages of activity-led funding analysis is that it is complex and hence incurs additional administrative costs. The two case studies noted here were time consuming and very difficult to do since expenditure had to be inferred from timetables. There were no standard classifications of programmes and expenditures and these had to be constructed in order that comparative data could be obtained. However, once set up, the model can be readily adapted to reflect changes in funding levels or policy changes (for example, in class size or curriculum) or in the prices (costs) of particular resources.

The parameters from an activity-led funding analysis are not always objective in that they often reflect factors based on teachers' and administrators' subjective judgements in which self-interest may play a large part. Therefore activity-led funding formulae may tend to overestimate the need for resources.

As noted, activity-led funding analyses undertaken by LEAs in England have generally produced estimates of resource requirements which cost more than the budget available. However, it is important to note that the relativities that are established between students in different phases or grades can be preserved within a final funding formula even if the total amount indicated by an activity led analysis cannot be afforded. Alternatively, a distinction can be made between resource levels which it would be desirable to fund and those which can actually be funded. The Cambridgeshire example illustrates this by showing how class size assumptions may be adjusted upwards until an affordable unit cost has been reached.

The fact that activity-led funding analyses, especially when the assumptions are guided by professional judgement about desired best practice, tend to produce allocations which could not be financed out of the available budget total, makes funding agencies less keen to use them, whereas they are popular with education pressure groups. Nevertheless, this approach does provide a logical rationale for funding allocations and can be kept within financial constraints by making appropriate judgements about resource requirements.

Despite the drawbacks just noted, activity-led funding is the best method for using resource allocation to promote school effectiveness – since funding is directly related to the costs of the quality of educational provision expected from schools. It is also one of the

few approaches that identifies explicitly where funds are being spent per student within schools – and such information is important in opening up rational debates about resource usage. Activity-led funding need not be as detailed and elaborate as in the two case studies presented in this chapter. How complex to make the approach in practice is a matter of judgement, weighing expected costs and benefits from the trade-off between complexity and simplicity.

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Chapter 5

Component 3: Student supplementary educational needs

Peter W. Hill and Kenneth N. Ross

Introduction

Perhaps the most politically sensitive issue in developing needs-based school funding formulae is the nature of any adjustments made for student factors that impact on the resources required by schools in order to provide a specified quality of education. The expression 'quality of education' is taken here to include both opportunities to gain access to the curriculum (equal opportunity) and levels of attainment within the curriculum (equal outcomes).

As mentioned at the beginning of this book, just dividing a given total educational budget evenly among all students is an administratively simple task – but would not represent needs-based resource allocation unless it had been agreed and demonstrated that all students in all schools had equal needs. In most education systems, there are manifest differences in the learning needs of students attending different schools and widespread recognition that these differences should be reflected in funding policies. At the same time, there is usually substantial debate about the goals of supplementary educational needs funding, about methods of quantifying student needs, and about the emphasis placed on particular indicators of these needs.

The rationale for supplementary educational needs funding

Supplementary educational needs funding has been advocated in order to address three main areas of need: socio-economic disadvantage; disabilities, impairments and learning difficulties; and individual learning needs. Each of these has clear linkages with fundamental value systems that guide the evolution of national systems of education.

(a) Socio-economic disadvantage: a focus on equality and fraternity

The first area of need arises from the observation that, in most systems of education, students from relatively disadvantaged home

backgrounds tend to have lower levels of educational achievement than those from advantaged backgrounds. General consciousness about this inequity was raised dramatically following the publication of a number of landmark studies and reports, of which the best known were those produced in the USA under the leadership of James Coleman (Coleman, Campbell, Hobson, McPartland, Mood, Weinfield and York, 1966) and Christopher Jencks (Jencks, Smith, Acland, Bane, Cohen, Gentis, Heynes, and Michelson, 1972); and also in the United Kingdom by Lady Plowden and members of the committee of enquiry that she chaired (Plowden, 1967). These reports had a major impact on policy-makers and demonstrated beyond all doubt that there was a strong relationship between the family background of students and their capacities and opportunities to access and benefit from schooling. They also provided conclusive evidence that some schools faced a much more difficult challenge than other schools in ensuring successful learning outcomes for all students on account of the impoverished social and educational home backgrounds of their students.

The policy response of governments in the 1960s and 1970s to this clear evidence was to implement educational programmes aimed at compensating for socio-economic disadvantage. These programmes generally provided additional funds for sub-groups or special categories of students, or to whole school communities, in order to enable them to seek to ameliorate their disadvantage; and they were often conceived as part of a broader range of equity or social justice policies.

The emphasis that should be placed on education in redressing socio-economic disadvantage has been a matter of vigorous debate. The message from the Coleman Report (Coleman et al., 1966) was that schools bring little influence to bear on children's achievement that is independent of their home backgrounds and general social context. This conclusion suggested that there were distinct limits to the benefits associated with policies directed at education as a means of redressing socio-economic disadvantage relative to other broader policies aimed at redistributing wealth and reducing social inequalities. These views were subsequently challenged by other evidence of the existence of effective schools in which students make greater progress than would be expected from a consideration of the social profile of their intakes (Edmonds, 1979; Rutter, Maughan, Mortimer, Ouston, and Smith, 1979).

Evaluations of the effectiveness of compensatory funding programmes suggest that while educational opportunities have often been improved, the gaps between the attainment levels of students from advantaged and disadvantaged home backgrounds have rarely been reduced and never eliminated. This has led to questions being raised about the value of such programmes and about the best

way of addressing the needs of educationally disadvantaged students. Increasingly, attention is turning away from the simple provision of additional funds as a means of ameliorating the effects of socio-economic disadvantage, towards programmes that have a greater focus on educational processes and are more closely linked with resource usage (as distinct from resource provision).

(b) Disabilities, impairments and learning difficulties: a focus on access

Student special needs funding has also been advocated for a relatively smaller proportion of students that can be categorized as having disabilities, impairments, and learning difficulties which generate needs for additional funding to enable them to be educated in either a special or mainstream school setting. The range of conditions encompassed by the terms disabilities, impairments, and learning difficulties is extensive and includes reduced mobility, lack of fine-motor skills, need for assistance to ensure personal safety and care, impairment in hearing and vision, specific learning difficulties, cognitive impairments, medical conditions, and extreme behavioural problems.

Policy responses to addressing the needs of students with disabilities, impairments, and learning difficulties have undergone dramatic changes during the second half of this century. The initial response, particularly to those with physical disabilities and cognitive impairments may be described as one of denial. Such individuals were often hidden from society and stayed at home, with little help being provided to parents from public sources. A later response was to seek to provide public support, often involving institutionalizing young people, but within a health or care-giving setting rather than an educational setting. Still later, such individuals were placed in 'special' schools, which were separated from 'regular' schools. The degree of emphasis on education as opposed to care-giving within these special schools tended to vary a great deal, not only in relation to the nature of the disabilities and impairments of individual students, but also as a matter of policy emphasis.

In the 1970s and 1980s the response in many countries changed towards providing the parents of these young people with the option of having their child partially or fully 'integrated' into mainstream schools. This was often achieved as part of a general movement aimed at eliminating practices that unfairly discriminated against individuals on the basis of disabilities and impairments. In addition, there has been increased recognition in recent years of specific kinds of acute 'learning difficulties' that previously went unrecognized. Indeed, the proportions of students classified in this manner has increased dramatically and has been a major factor in

accounting for increased expenditure on supplementary educational needs funding.

An increased worldwide interest in integration within regular schooling has focused attention on identifying appropriate levels of additional funding for students with disabilities, impairments, and learning difficulties. In systems in which all such students are placed in special schools, separate funding arrangements can be made that are unrelated to the costs of educational programmes in regular schools. Integration policies, however, generate a demand for more precise approaches to establishing actual costs of provision. It is also relevant to note that the rationale for additional funding for students with disabilities, impairments, and learning difficulties has typically been related to the costs of the support, specialist care, and facilities required to allow such students to attend school (equal access), rather than as a means of addressing inequalities in educational outcomes (equal outcomes). In other words, the success of integration programmes has tended to be viewed in terms of the extent to which the individual child is integrated into the day-to-day programme of a regular school, and is at ease with, and accepted by, fellow students.

(c) Individual learning needs: a focus on outcomes

The third rationale for student special needs funding begins with the observation that significant numbers of students fail to achieve at the same level as the highest achieving students in any given age cohort and that many fail to achieve at minimum levels of competence.

Over the past decade many education systems have implemented comprehensive assessment programmes using either samples of students or full-cohort testing to ascertain the educational performance levels of students. The evidence from such assessment programmes consistently indicates that the range of educational achievement among students within a given year of schooling is much greater than the differences in average achievement for adjacent year or grade levels. For example, in a report of a recent national survey of literacy in Australia (the National School Literacy Survey) the most significant finding identified by the authors was the wide range of literacy achievement within the two cohorts of students surveyed. In this survey it was established that the top 10 percent of students in both Grades 3 and 5 were working about five years ahead of the bottom 10 percent of students (Management Committee for the National School English Literacy Survey, 1997).

The existence of such gaps and the evidence of the failure of many students to reach minimum standards has given rise to a range of programmes to overcome difficulties experienced by low-achieving

students. These programmes have tended to target students in the early years of schooling who may be categorized as being 'at risk' of falling even further behind in later years and for whom early intervention provides a higher probability of success in enabling them to catch up to their peers. An emphasis on prevention and early intervention is supported by research findings indicating the relative lack of success of intervention programmes for older students (Kennedy, Birman and Demaline, 1986). The key underlying assumption of many funding strategies in this area has been the belief that all students can engage in higher-order learning provided that they are given sufficient time and support (Odden, 1995).

There is a long history of additional funds being made available for programmes to address the needs of low-achieving students. Examples in Australia and New Zealand may be seen in the funds provided by many school systems to implement projects such as *Reading Recovery* (Clay, 1993). Such programmes have been shown to be relatively expensive in the short term, but are cost-effective in the longer term when the social costs of failure to intervene successfully are considered, such as lost tax revenues, increased unemployment benefits, and larger crime-related costs (Dyer, 1992).

Recent developments in the USA for providing programmes to address individual learning needs have focused on whole school and school community reforms which concentrate specifically on improving learning for all students, especially low achievers. The best known of these have been the set of nine 'school designs' promoted through the New American Schools Development Corporation (see especially, Stringfield, Ross and Smith, 1996). The positive impact of these designs, coupled with the perception of the relative ineffectiveness of traditional compensatory funding programmes, has contributed to a change of policy towards supplementary educational needs funding in the USA, particularly funding provided by the Federal government through 'Title I' of the Elementary and Secondary Education Act. 'Title I' students are now expected to have opportunities to achieve to the same standards set by states and local districts as non-'Title I' students (Smith, Scoll and Link, 1996).

The three areas of need examined above (socio-economic; disabilities, impairments, and learning difficulties; and individual learning needs) are conceptually distinct – but are often found to overlap for many students. The challenge for the developers of funding formulae is to bring these three aspects of need together into a consistent framework for funding purposes. This raises a number of difficult measurement issues which will be explored later in this chapter. However, in order to better understand current approaches in this area, it is important to recognize that substantial advances for building indicators to guide funding decisions in school systems were

made decades earlier. These earlier indicators were mainly used to identify sub-groups of schools and students that would receive supplementary funding – rather than for application to whole systems of education. Some examples of these 'historical antecedents' of formula funding will be described in the following discussion.

Some historical antecedents of formula funding

In order to better understand current approaches to formula funding of schools across whole systems of education, it is helpful to know something of the history of attempts to accommodate student factors in school funding arrangements. In this section, we briefly review historical developments in the United States of America, the United Kingdom, and Australia by way of illustrating some important antecedents of current approaches. It should be noted that not all of these early developments were concerned with allocating funds directly to schools, but rather to school districts or local education authorities. Nevertheless these initiatives in many ways provided the starting points for more recent school-based funding arrangements.

(a) Title I Programme in the United States of America

In the United States of America, the allocation of funds for the 'Title I' programme was based originally on economic criteria in order to provide assistance for "the special needs of children from low-income families and the impact that concentrations of low-income families have had on the ability of local educational agencies to support adequate educational programmes" (United States House of Representatives, 1978). The indicator used to operationalize this definition was based on a count of poor children derived from census data according to the following three categories (United States Department of Health, Education and Welfare, 1976):

(i) children aged 5 to 17 years from families designated as poor according to the Orshansky (1965) poverty formula applied to the population census;
(ii) two-thirds of the children aged 5 to 17 years receiving payments under the Aid to Families with Dependent Children programmes; and
(iii) children aged 5 to 17 years being supported by public funds who live in foster homes or in institutions for neglected or delinquent children.

This indicator was used to allocate funds among states. Within states the allocations to school districts and then schools within school

districts were made by using a variety of indicators which were similarly based on poverty 'counts' (Blackburn, 1979).

(b) Educational Priority Areas Programmes in the United Kingdom

The Plowden Report (Plowden, 1967) in the United Kingdom demonstrated that parental attitudes were of prime importance in explaining variation in the educational achievement of students. However, it was reasoned that a moral hazard might be created if a complete census of parental attitudes was undertaken when the purpose for collecting the data became public knowledge. Instead, the Plowden Report listed eight factors which were assessed as being suitable for identifying "those places where educational handicaps are reinforced by social handicaps: parent occupation, size of family, social welfare payments, overcrowded living conditions, school attendance rates, proportions of handicapped persons, incomplete families, and children unable to speak English" (Plowden, 1967: 57-59).

Various attempts were made by local education authorities to use these factors to guide the selection of suitable indicators. However, anomalies arose because of the types of measures that were used to assess the dimensions and the weightings given to particular measures in the construction of indicators (Halsey (ed.), 1972). One of the most widely accepted attempts at indicator construction was carried out for the Inner London Education Authority by Little and Mabey (1971). This indicator consisted of 10 factors: occupational status, children receiving free meals, overcrowded housing, lack of housing amenities, handicapped children, immigrant children, teacher turnover, student turnover, absenteeism, and family size. The measures were standardized to have equal variance and then added together with equal weights to form the indicator (Halsey (ed.), 1972).

The measures used in the construction of this indicator were derived from various sources. The measures related to occupational status, overcrowded housing, lack of housing amenities, and family size, were obtained from census data; the measures related to children receiving free meals, immigrant children, teacher turnover, student turnover, and absenteeism were derived from various government department records; and the measure related to handicapped children was based on the percentage of children of low ability as judged by the national examination given to students at the end of primary schooling.

(c) Disadvantaged Schools Programme in Australia

The Karmel Report in Australia examined several approaches to the identification of schools for participation in the Australian Government's Disadvantaged Schools Programme. The initial 1973 national indicator of socio-economic disadvantage was derived from a range of census data describing occupations, ethnicity, education, family characteristics, religion, and housing. This indicator was intended to identify "schools drawing a high proportion of enrolments from neighbourhoods having certain characteristics known to be generally associated with a low capacity to take advantage of educational facilities" (Karmel, 1973:92). During the 1980s, methodological advances in constructing these kinds of indicators resulted in a three-stage approach that was adopted by many school systems in Australia for the purposes of identifying sub-groups of disadvantaged schools.

(i) *Mapping*. This involved linking each school's catchment area with the collection districts used for the Australian Census of Population and Housing.
(ii) *Merging*. This involved merging the results of the mapping stage with data derived from the most recent Census. The combined data file contained detailed social profiles (concerning occupational status, income, housing, ethnicity, etc.) for each school's catchment area.
(iii) *Analysis*. The final stage involved two steps. First, census variables were combined into conceptually distinct social dimensions. Second, these social dimensions were combined into a single indicator of socio-economic disadvantage by using weights for the dimensions that were consistent with a defensible definition of socio-economic disadvantage.

This so-called 'Ross Methodology' (Ross, 1983; Ross, Farish, and Plunkett, 1988) approach to constructing a socio-economic indicator was seen as having considerable advantages because it was significantly correlated with a wide range of measures describing the incidence of social and learning handicaps within schools, it was highly correlated with average school scores on tests of basic literacy, and it assured confidentiality because no personal information about students or their families was required. In the 1980s all government and non-government systems across Australia, with the exception of the New South Wales Government system, adopted various indicators of socio-economic disadvantage based on this methodology.

Classifying and evaluating resource allocation methods

Jordan, Lyons, and McDonough (1992) have developed a useful classification framework for analyzing the various ways of allocating supplementary educational needs funding to schools. This framework, summarized below, is generally applicable to the various approaches that have been applied in most systems of education.

(a) *Student weights.* Students are weighted according to comparative costs of meeting needs in different programme interventions.
(b) *Categorical aid.* Fixed amounts of funds are allocated on a per-student or per-school basis for students in different categories of need, not necessarily related to relative costs of programmes.
(c) *Competitive grants.* Schools compete for fixed or variable amounts of funds by submitting project proposals.
(d) *Excess cost reimbursement.* Schools are reimbursed the differences in costs relative to students in regular programmes.
(e) *Unit cost allocations.* Resources are allocated to schools on a per-teacher rather than per-student basis, with a minimum number of students required before funding for a teacher is provided.
(f) *Indicator or index of need.* Schools are funded according to an indicator of need generated on the basis of one or more student-level indicators.

The critical question of choosing the 'best' approach from those listed above was addressed by Jordan et al. (1992) through an examination of each approach according to the following criteria: stability and predictability, adequacy, efficiency, accountability, equity, responsiveness, and non-manipulability.

They concluded that the 'indicator of need' approach rated highest when assessed against the seven criteria, scoring positively on five of the seven: stability and predictability, efficiency, equity, responsiveness, and non-manipulability. They suggested that the main advantages of an indicator of need were that students did not have to be labelled to receive services, schools were given maximum flexibility in programming, and the use of such indicators had the potential for maximizing educational equity.

The notion of an indicator of need is consistent with the broader notion pursued in this book of needs-based school funding formulae and is the approach that is explored in greatest detail in this chapter with respect to funding student factors related to supplementary educational need. While the indicator-of-need approach is

the preferred approach to allocating supplementary funds to take into account student factors, it has one potential drawback. Jordan et al. (1992) noted that the primary disadvantage was the lack of accountability inherent in its use as a funding mechanism, and that policy-makers would want to build accountability measures into the rules and regulations related to applying such indicators.

This serves to highlight the fact that the development and use of an indicator of need should be accompanied by the parallel development and implementation of policies that seek to hold schools accountable for student learning outcomes. This would imply that policies would need to be developed to ensure that schools were responsible for: identifying students who are at risk, diagnosing the learning needs of those who are not making satisfactory progress, specifying and delivering programmes designed to address these needs, and evaluating the cost-effectiveness of these programmes in improving student learning outcomes.

Dimensions of supplementary educational needs funding formulae

As noted in *Chapter 3*, the supplementary educational needs component of formula funding can be broken down into a number of discrete dimensions of which the most frequently identified are: socio-economic disadvantage, non-fluency in the language of instruction, low educational achievement, and disabilities, impairments and learning difficulties.

It is important to note that these four dimensions are by no means independent of each other. Students identified as being 'at risk' on one of the dimensions are often identified as 'at risk' on one or more of the other dimensions. In other words, certain students may have multiple supplementary educational needs.

(a) Socio-economic disadvantage

As illustrated in earlier discussion, there are quite a number of historical antecedents linked with this dimension and there is a plethora of research studies that show the strong linkages between student home background and educational achievement. At the same time it should be pointed out that the actual operationalization of the dimension of 'socio-economic disadvantage' as one or several indicators remains a hotly contested issue in many countries. These debates stem from 'conceptual disagreements' concerning the choice of information to build indicators (for example: "Should family income, parental education, and parental occupation be used and, if so, what weight should each be given in constructing an indicator?") and from 'measurement disagreements' (for example: "Is it valid to code parental occupations on a status scale?").

A further issue here is data availability. For some school systems the collection of detailed information about the income, education, and occupation of parents may represent an invasion of privacy, and/or may be too expensive to collect and manipulate in order to build an indicator, and/or may lack salience with respect to local conditions and culture. For these kinds of school systems other 'less direct' indicators may provide useful alternatives – such as the use of a 'home possessions index', which has been used successfully to assess differences in socio-economic circumstances by the Southern Africa Consortium for Monitoring Educational Quality (Voigts, 1998).

(b) Non-fluency in the language of instruction

For schools serving populations with large numbers of students that have recently arrived from other countries and who do not speak the language of instruction, it may be necessary to establish separate, intensive language classes and to provide access to such classes for periods of time that are related to recency of arrival and age (since more resources will generally be required for more recent arrivals and older students). In other words, these students generate specific costs that are of a different kind from the more general additional costs of provision for students of low socio-economic-status families. For this reason, it is often appropriate to treat non-fluency in the language of instruction as a separate dimension within supplementary educational needs funding formulae.

(c) Low educational achievement

This dimension can be seen as the most direct indication of the need for supplementary educational needs. In fact, it is often used as an 'external' criterion variable against which other socio-economic dimensions may be judged (Ross, 1983). In the early days of the Title I Programme in the USA there were a number of attempts to base resource allocations on school mean scores on criterion-referenced tests rather than on social criteria (Emrick, 1974; Quie, 1974).

In the 1970s researchers led by Feldmesser (1975) presented comprehensive reviews of the dangers associated with the use of test scores to guide resource allocation. Feldmesser emphasized the problem of the 'moral hazard' associated with using this approach. If schools are funded on the basis of a measure of student educational achievement a perverse incentive is introduced whereby schools may be penalized financially if they record high achievement levels and rewarded financially if achievement levels are low. This problem is typically avoided by the use of an indicator

comprising those socio-economic factors that best predict whether students are 'at risk' of experiencing low educational achievement. In practice, this has usually involved obtaining a measure of the level of 'educational disadvantage' of the students attending each school and then allocating the available funds in proportion to this measure.

(d) Disabilities, impairments and learning difficulties

For students with disabilities, impairments and learning difficulties, specific kinds of additional resources are typically required to provide specialist support and assistance to enable them to participate in class activities. For many such students the school may need to make separate provision, on an individual basis, and funding will therefore need to be provided on a case-by-case basis in order to meet the additional cost of this provision.

Issues to be addressed prior to indicator construction

This section considers the development of formulae for supplementary educational needs funding. Such formulae can be simple or complex. A simple formula has the advantage that it is more readily understood. On the other hand, a complex formula is sometimes necessary to capture adequately the relevant dimensions that need to be taken into consideration.

In the following discussion several formula construction issues have been explored – before moving on to more specific issues related to the selection and use of indicators to represent various dimensions of supplementary educational need. The first issue – 'variation among and within schools' – goes to the very heart of formula funding methodologies related to student needs because it provides a framework for deciding whether this approach to resource allocation is worth the effort. The second issue – 'units of analysis' – examines the unit of analysis problem in order to highlight the need for specifying whether students or schools will be used as the unit of analysis in constructing indicator scores. The third issue – 'moving from formulae to funding' – explores the conceptual linkages between formulae and funding.

(a) Variation among and within schools

Before proceeding with the development of a formula-based approach to supplementary needs funding, it may be necessary to establish whether there are significant differences in the educational needs of students attending different schools. In school systems

where there is little or no variation among schools with respect to patterns of educational disadvantage, there is no need to develop detailed measures because each school will have similar proportions of students in difficulty. In this case there is no compelling need to develop a complex funding formula because a total student enrolment figure would provide an adequate mechanism around which a 'formula' could be built. On the other hand, if there are large variations among schools with respect to the educational needs of students, then this would mean that students in most difficulty were concentrated in a subset of schools which should become the targets for extra assistance.

The coefficient of intra-school correlation (rho) may be used to partition the total variation in student educational need (as measured, for example, by a test of reading literacy) into the component due to variation among schools and the component due to variation among students within schools (Ross, 1976). When rho is multiplied by 100 we obtain a percentage which expresses the percentage of total variation among students that is attributable to variation among schools. For example, if 100 × rho is equal to 20, then we may say that 20 percent of the total variation in student educational needs is related to variation among schools, and that 80 percent is related to variation among students within schools.

Table 5.1. Estimates of intra-class correlation coefficients (100 × rho) for eight countries that participated in the IEA International Study of Reading Literacy

Country	Primary schools	Secondary schools
Finland	8	3
France	14	35
Iceland	9	8
Ireland	16	48
Netherlands	13	50
New Zealand	19	41
Norway	5	6
Spain	18	22
Sweden	9	8
USA	19	42

In *Table 5.1*, some values of rho have been presented for 10 countries that participated in the IEA International Study of Reading

Literacy (Elley, 1992). The general pattern of these results suggests two major trends. First, there was limited variation among schools in the four Nordic countries – with less than 10 percent being attributable to variation among schools at both the primary and secondary-school levels in Finland, Iceland, Norway, and Sweden. Second, for the other six countries the variation attributable to variation among schools was small for primary schools (13 to 19 percent) and much larger for secondary schools (35 to 50 percent).

The figures presented in *Table 5.1* indicated that there was a limited requirement for constructing an indicator of supplementary educational need based on reading literacy test scores in the four Nordic countries because most of the variation in need (91 to 97 percent) was attributable to variation among students within schools. In these four school systems a simple count of total enrolments would suffice as an indicator because all schools have such a similar incidence of needs. There was a somewhat stronger case for the construction of an appropriate indicator for the other six countries at the primary-school level, and a very strong case at the secondary-school level. As a general rule, the higher the intra-school correlation, the greater the rationale for building an appropriate indicator of supplementary educational need at the student level.

(b) Units of analysis

Formulae for supplementary educational needs funding can be developed using information at different levels of aggregation. An example of school-level information would be the average socio-economic level of the community in which the school was located. An example of student-level information would be whether or not individual students in a given school were from families in receipt of welfare payments (living in poverty). This highlights the importance of giving careful attention to the appropriate *unit of analysis* in constructing indicators of need. Should funding for socio-economic disadvantage be made on the basis of data collected at the level of a geographic area, the school, a cohort of students, or the individual student? In some instances, the answer to this question is determined by considerations of availability of information, cost, ease of obtaining the data, and non-intrusiveness. For example, quality information on a range of socio-economic indicators may be available through national census collections and may be relatively cheap to obtain. These data may have been collected at the household level, but may be available only at an aggregated level for geographic areas.

From a measurement point of view, it is preferable to develop an indicator of need using student-level data since it is at this level that home and background factors mainly operate to influence

individual learning and educational outcomes. While it is likely that certain variables measured at a higher level of aggregation (namely, the school or the geographic area in which the school is located) will have an effect on outcomes over and above the effect of the same variables measured at the student level, in most school systems the largest proportion of the variation (either among students or among schools) is accounted for by variables that have been measured using student-level information. The optimal strategy in developing indicators in this area is to begin by modelling data at the student level and to subsequently test whether variables measured at a higher level of aggregation provide additional explanatory power. This in turn implies the use of a multi-level approach to conceptualizing indicators and also the use of multi-level methods of analysis.

(c) Moving from formulae to funding

The construction of funding formulae for student supplementary educational needs (SEN) generally results in a final formula that takes the following form:

SEN funding (F) for school j = Index of need (I) for school j × funding constant (C)

or more simply

$$F_j = I_j C$$

Thus it is necessary to consider methods for arriving at both of the terms on the righthand side of the above equation, namely the indicator of student supplementary educational need (I) and the funding coefficient (C). The latter may be defined as the amount of resources allocated to the school per unit of I. Having generated an index of need (I), it is necessary to do two things. The first is to develop a method for determining the magnitude of the component of the total budget that will be allocated for student supplementary educational needs. The second is to establish a systematic way of converting values on the indicator to a monetary amount.

In most education systems, the component of the total budget allocated for student supplementary educational need is arrived at through political processes rather than through an analysis of the actual costs involved in providing a specified quality of education. This reflects not only the inherently political nature of decisions about levels of funding for school education, but also the difficulties researchers have experienced in establishing unambiguous links

between resource inputs and educational outcomes.[1] Despite these difficulties, it is nevertheless possible to indicate specific issues that it is useful to address in determining the quantum or proportion of the total budget to be allocated for student specific supplementary educational need.

One is variation in the capacity of schools to raise local revenues and in the capacity of parents to meet incidental costs associated with attendance at school, including, for example, voluntary contributions or fees, the purchase of textbooks, equipment and school uniforms, costs of materials and charges for excursions and educational visits. If it can be demonstrated that schools serving more affluent communities have a significantly enhanced capacity to generate resources locally, then it is appropriate that the quantum of funding is such as to enable either full or partial compensation for students in disadvantaged schools.

Another issue relates to the quantifiable additional costs of programmes in disadvantaged schools. Particularly in the early years of schooling, it is possible to generate fairly precise estimates of the proportion of students in such schools that are 'at risk' of not making satisfactory progress and who are likely to require specific prevention and intervention programmes and strategies such as smaller classes in the first year of schooling, one-to-one tutoring for students making poor progress in the second year of schooling, the appointment of a home liaison officer, and so on. By working out the average costs of implementing various proven programmes, it is possible to work out whether the proposed quantum or proportion of the total budget to be allocated to disadvantaged schools is sufficient to enable them to operate appropriate programmes without adverse consequences on their overall provision. An example of a study that has examined this issue in some detail is that of Odden and Busch (1998).

Another approach to converting values on an indicator of need to a quantum of funds is to use scores on the indicator to create funding categories and to allocate a defined quantum of resources to each category. This is the approach that was adopted in Australia in allocating resources for the Disadvantaged Schools Programme. An indicator of need was used to assign schools to one of just two categories. Schools above the selected value received no funding, while schools below the threshold received an approximately fixed per-capita amount of funding. The advantage of this method was

1. There has been substantial debate and controversy regarding the strength of the relationship between spending on education and educational outcomes, with some scholars, notably Hanushek (1989, 1997), arguing that the relationship is weak and inconsistent, and others, notably Hedges, Lane and Greenwald (1994), challenging Hanushek's conclusions.

116

that it was simple to understand and to administer. The disadvantage was that minor changes in the indicator score could result in major changes in funding allocated to schools near the threshold.

Constructing indicators of student supplementary educational need

(a) Socio-economic disadvantage

We begin with the case of developing an indicator of educational need concerned with a dimension of socio-economic disadvantage. The steps involved in creating such an indicator involve choosing a potential set of indicators to measure socio-economic status and carrying out an empirical study to determine how well each of these potential indicators functions in terms of traditional measurement properties such as validity, reliability, feasibility, cost, non-manipulability, and so on.

In selecting potential indicators of socio-economic status, it will be necessary to make use of local knowledge to ensure that the most relevant factors have been addressed. In some systems it will be appropriate to consider the use of measures of occupational status, family income and minority group status. In other systems, where data availability is limited, a more simple 'list of possessions' approach may be more suitable. It is important that measures are selected that are not easily manipulated by the school, that may be readily subjected to external verification, that are not expensive to obtain, that span the range of conditions represented by socio-economic disadvantage (construct validity), and that are not overly intrusive with respect to the privacy of individuals.

Final decisions about the actual indicators comprising a dimension of need should be made by obtaining data on educational disadvantage and student progress from a large and representative sample of schools and analyzing these data. This process is illustrated below by reference to the development of an indicator of socio-economic disadvantage for use in government schools in Victoria, Australia.

In 1992 the State Government in Victoria, Australia embarked on a policy of radical devolution of decision-making within school education (Caldwell and Hayward, 1998). A key component of this policy involved a complete overhaul of funding arrangements and the implementation of formula-based funding for almost 90 percent of the total government funding available for school education. The committee established to advise on the details of the new funding arrangements (Education Committee, June 1992) reviewed the existing methodology that was being used to measure the socio-economic status and to allocate funds to so-called 'disadvantaged'

schools. The committee concluded that an improved indicator could be developed if use were made of current data on the actual students in each school and if indicators were selected on the basis of a new study using current student achievement data. Accordingly, the committee initiated a research project aimed at identifying those characteristics of students that best predicted student progress at school.

Data were obtained from a total sample of 7,233 students in Grades 1, 3, 5, 8 and 11 in 83 schools randomly selected to be representative of schools across the state. A list of potential measures of socio-economic status was arrived at following an intensive all-day session with project schools at which an initial list of indicators was considered. Following trials, a questionnaire to collect information on an initial set of more than 20 potential indicators was sent to project schools. This questionnaire contained a number of indicators that were acknowledged as unlikely to form part of any final dimension because they involved relatively subjective judgements on the part of teachers. It was nevertheless considered important to include these indicators in the research study to ascertain the extent to which other less subjective indicators were equally effective in predicting student progress.

In analyzing the data, a number of structural equation and multilevel regression models were fitted. In these models, the linkages between various measures of socio-economic disadvantage and a range of student outcomes were explored. The outcome measures included whether or not the student's literacy performance was well below the standard expected for his/her grade level, whether the student was rated by teachers as being at risk of not completing the final year of schooling (for secondary-school students), and whether the student's behaviour was rated by the teacher as inattentive, disruptive, or withdrawn. This modelling indicated that the following six measures were the best predictors of student outcomes.

(i) *Poverty* (X_1) – whether or not the student's family was in receipt of an education welfare payment;
(ii) *Occupational status* (X_2) – whether the main breadwinner in the student's family was unemployed, or in an unskilled, skilled, white collar, or professional occupation;
(iii) *Non-fluency in the language of instruction* (X_3) – whether a language other than English was spoken at home;
(iv) *Family* (X_4) – whether the student was living with two parents, with one parent, or with neither parents;
(v) *Aboriginality* (X_5) – whether or not the student identified himself or herself as an indigenous person; and
(vi) *Transience* (X_6) – whether or not the student had changed schools recently.

It was found that the use of unit weights for each student, using the above information, resulted in almost identical indicator scores to one based on factor score regression weights. As a result, unit weights were used for most variables to combine them into the overall indicator. The only exception was the use of a 0.5 weight for *Language spoken at home*. The different weight for this single item of information was adopted to avoid a tendency for it to dominate the final indicator. The formula for the indicator was:

$$\text{Indicator of student supplementary educational needs} = X_1 + X_2 + 0.5X_3 + X_4 + X_5 + X_6$$

An eligibility threshold was applied to this indicator so that funds were allocated only to the 30 percent of schools with the most 'at risk' students. In the first year of implementation, measures of *occupational status* and of *family* were not available, but they were developed for use in the 1997 school year. This has involved the establishment of systematic and secure data collection procedures for all enrolled students in government schools in a form that can readily be verified and collated for the purposes of allocating funds.

(b) Non-fluency in the language of instruction

For schools serving populations with large numbers of students that are newly arrived from other countries and who are not fluent in the language of instruction of the school, it is often necessary to establish separate, intensive language classes and to provide access to such classes for periods of time related to students' recency of arrival and age. The more recently arrived and the older the students, the more assistance they are likely to require. Sometimes problems of lack of fluency in the language of instruction are further compounded by other factors. For example, these students may come from refugee families and may have experienced psychological trauma and a highly dislocated education. They may also have come from very different cultural backgrounds and therefore find difficulty in adjusting to the culture of the school.

These students generate specific, but usually short- to middle-term, costs that are of a different kind from the more general and longer-term additional costs of provision for students of low socio-economic-status families. For this reason, it is often appropriate to treat non-fluency in the language of instruction as a separate dimension within supplementary educational needs funding formulae. In the middle to longer term, once students have mastered the language of instruction of the school, they may make rapid progress and indeed have a motivation to succeed that enables them to outperform

the majority of their fellow students. In the short term, however, they usually require considerable specialized, intensive assistance.

Measuring this dimension of supplementary educational need may involve obtaining several indicators for each student, but especially their age and recency of arrival. In Victoria, Australia, the government committee that reviewed formula funding of schools recommended that students from migrant families should be grouped according to three categories of recency of arrival and four levels of schooling (lower primary, upper primary, lower secondary, and upper secondary). The latter categorization was chosen in preference to the age of the student in view of the known costs associated with different phases of schooling. In addition, the committee proposed that a funding threshold should apply so that funds would be directed only to those schools with the highest need, as indicated by significant numbers of students from non-English-speaking countries.

(c) Low educational achievement

As mentioned in previous discussion, this indicator, although arguably the most direct measure of the dimension of student supplementary educational need, has often been avoided because of the moral hazard associated with using low test scores as a requirement for receiving extra funding. However, two recent developments may soon change this situation and may therefore subsequently return this indicator to 'centre stage' in formula funding approaches.

First, in a number of countries there has been a major growth in national testing programmes covering all schools. In these countries it may be possible to employ test results from a previous cycle of schooling as an indicator of the potential for future low educational achievement. For example, school readiness tests are being used for all five year-olds in the United Kingdom and these scores could be used for the construction of formulae at the primary-school level. Similarly, state-wide testing in Victoria, Australia, at the upper primary-school level could be used for secondary-school funding formulae.

Second, the recent trend to use the results of national testing programmes for school accountability purposes and for consumption by the general public may limit the potential for a moral hazard situation. This is particularly the case in school systems that employ school-based management approaches, because the evaluation of each school's performance relative to the charter or contract that it has with the government is tightly integrated with the expectation of high (or 'better') levels of student educational outcomes.

(d) Measuring disabilities, impairments and learning difficulties

The extent to which student supplementary educational need is related to extremely profound individual learning needs, can only be identified by professional assessment. Standardized tests of educational attainment in literacy and numeracy or of cognitive ability can be used to identify certain learning needs in individual children provided that these are within the 'normal' range of needs. But in many cases, where learning difficulties arise from physical impairments which can be addressed by special provision (for example, computers, hearing aids, ramps, additional personal assistance, as well as special programmes), children's learning needs must be assessed on an individual basis by professionals in collaboration with parents. Both the child's teachers and externally employed educational psychologists then need to undertake a systematic assessment of the child's learning needs using evidence gathered over a period of time. The assessment usually includes recommendations for the additional educational provision which the child requires.

In the United Kingdom, for example, children's learning needs are individually assessed within the framework of the Special Needs Code of Practice (DFE, 1994). This provides for five levels of 'special needs' assessment. Level 1 requires action by the child's teacher, level 2 involves the school's special needs co-ordinator, and level 3 brings in external help (for example, from the local education authority). If the resources required to address the child's learning needs are still considered inadequate, then the assessment proceeds to level 4 and a legally binding 'statement of special educational need' is sought. At level 5 it is known that a statement has already been obtained. Statements of special educational need were introduced by legislation in 1981, following the Warnock Report (1978). Local education authorities are charged with the duty to issue statements of educational need following a process of professional assessment of the child. A statement consists of an assessment of the child's learning needs and of the resources which are to be provided. For instance, it may contain a requirement that a student has a specified number of mainstream school hours each week, additional teaching, or help from a trained special-needs support assistant. Alternatively, a place in a special school or unit attached to a school may be explicitly specified.

The advantage of individually assessing children's learning needs and matching resources to the assessment is that the provision should be appropriate and guaranteed. However, it does have disadvantages because it may stigmatize and isolate a child in ways which would be avoided if the school undertook its own identification of

learning need and resourced additional provision from its supplementary educational needs budget. Another problem is the tendency for the proportion of children with statements to rise over time as parents and schools seek to statement children in order to obtain additional resources. The resulting reduction in resourcing levels for other children adds to further competitive pressures to secure more resources for children with some form of learning difficulty. This has occurred in England, where the percentage of students with statements of special educational need at the national level has been steadily rising from 1.6 in 1985 to 3.4 by 1994 (Audit Commission, 1997) and is as high as 5 per cent in some LEAs.

Clearly some children's learning needs are such that they require individual assessment and expensive provision. However, beyond this 1 to 2 percent, the issue which education funding policy must address is how to link funding with provision for the further 20 percent or so of children with supplementary learning needs that fall at the lower end of the 'normal' range. One method is to fund schools according to the predicted incidence of supplementary educational needs amongst their students and leave identification and provision arrangements to schools. The other is to identify and fund a wider range of individual children with various forms of supplementary learning needs within mainstream schools. In both cases decisions also need to be made about the best way of ensuring schools are accountable for how they spend supplementary educational needs funding. For example, in the United Kingdom, the Special Needs Code of Practice requires each child on the school's special needs register to have an educational plan including identified resources which is monitored on a regular basis.

Conclusion

(a) The interplay of political and technical considerations

As noted at the beginning of this chapter, the provision of supplementary special needs funding is an issue of high political sensitivity in most systems. As a consequence, there is often a complex interplay of political and technical considerations in the development of relevant indicators. In other words, 'getting it right' is as much an art as it is a science. In this concluding section, consideration is given to some of the more common situations that are likely to be confronted that call for both technical and political judgement.

The first relates to the inclusion or exclusion of certain indicators as part of a measure of need. On technical grounds, there may be a strong case for including certain indicators of disadvantage within an overall measure, but sensitivities regarding the collection

of such information may rule out its use. This may apply to the use of indicators of occupational status or of certain home and family characteristics. In such cases, it is often necessary to look for and use alternative indicators that may lead to an overall measure that may be somewhat less valid but is much more acceptable.

The reverse situation can also occur. For example, when a number of highly correlated indicators are used to form an overall pattern of need, it is often the case that a particular indicator that has considerable political significance and, on its own, can be demonstrated to be empirically significant, is nevertheless rendered redundant by the inclusion of other more powerful indicators. An example of this occurred in the development of the Victoria, Australia, Special Educational Needs Dimension. When information on poverty, occupational status and transience was included, it was found that Aboriginality (whether the student identified himself or herself as being an Aboriginal or Torres Strait Islander) was statistically non-significant. This was despite the fact that achievement levels of Aboriginal students were substantially lower than levels of achievement of any other group in the community. The empirical results suggested, however, that the cause of their low levels of achievement was connected more to the general socio-economic conditions confronting indigenous students than to specific reasons associated with their Aboriginality or Torres Strait Islander status. While on technical grounds this would suggest excluding Aboriginality from the overall indicator, from a political perspective this was deemed unacceptable, since there was a high probability that this would be interpreted by many as indicating that the quite considerable educational disadvantage confronting indigenous students had been deliberately ignored. Thus a decision was made on political rather than technical grounds to include Aboriginality in the index, even though its inclusion did not contribute significantly to the overall predictive validity of the index.

Another example of the close interplay of political and technical considerations relates to the weights applied to each of the indicators comprising an overall measure of need. Statistical modelling of data may suggest that the optimal way of combining indicators to form an overall dimension is to weight each indicator differently. From a political perspective, however, the rationale for assigning different weights may be problematic because it is likely to attract criticism from various interest groups, who will not appreciate the technical arguments for differential weights and will see them as a political statement about the relative importance attached to different groups in the community. For this reason, there are often good political arguments for weighting all indicators equally within an overall dimension. From a technical point of view, this often makes

little difference to the overall dimension in situations where indicators are highly correlated. In other words, a unit-weighted dimension gives an almost identical result to one constructed using differential weights such as factor score regression coefficients.

Yet another example of the interplay of political and technical considerations relates to whether a particular student factor is incorporated as an indicator within an overall dimension, or is treated separately. From a technical perspective, it may be appropriate to incorporate a particular indicator into the measure of a particular dimension of need, while from a political perspective there may be pressures to keep it separate. For example, there may be little difference from a technical perspective in the issues involved in allocating funds for a wide range of disabilities and impairments, but at the human level the distinction between physical and intellectual disabilities and impairments is often an important one that, as a consequence, generates a political imperative to keep the two conditions distinct within the development of formulae. These were sensitivities that had to be taken into account in the United Kingdom during the development of a dimension of need for students with disabilities and impairments.

The above examples illustrate the need for frequent dialogue between policy-makers and those assigned the technical task of constructing a dimension of need. A dimension of need must not only be fair, but must be perceived by all relevant groups to be fair. This will be assisted by close involvement of affected groups in the development and decision-making process.

The failure to be seen to be fair has led in the United States of America to a series of legal challenges that have resulted in intervention by the courts in school financing arrangements in order to reduce inequities in funding to schools. Decisions by state courts have impacted significantly on financing systems across the USA, including in California, Kentucky, Massachusetts, New Jersey and Texas. While such legal challenges may be much rarer in other countries (at least, for the time being), it nevertheless remains true that there is increasing public, and hence political, interest in all countries in how funds are allocated to schools.

(b) Areas for future research and development

When initial work undertaken in the 1970s into ways of including an element of supplementary educational needs funding into school finance allocation mechanisms are compared to the recent attempts, it is evident that considerable progress has been made over a relatively short space of time. There is now a universal recognition of the rationale for, and advantages of, formula-based approaches to supplementing resources available to schools serving more

educationally disadvantaged students or students with special educational needs. There is also increasing sophistication in the approaches taken to developing formulae and a greater awareness of the need for carefully designed studies into relevant indicators of need and of mechanisms for linking this research to monetary values.

The stage has now been reached when there would be great value in encouraging the involvement of economists and econometricians in detailed work of formula-based approaches to funding generally, but in particular in the area of funding student supplementary educational needs. Unfortunately, educational planners and economists working in the area of education often work independently and little connection is made between the work of one group and the thinking and writing of the other. It is suggested that there is considerable scope for rapid advances in the field through the establishment of expert teams of educational planners and economists specializing in education.

The focus of attention for further work will continue to be the development of funding formulae linked to accountability mechanisms that guarantee provision of a specified quality of education. In other words, the focus will continue to be on making sure that resources are used in ways that make a difference and on programmes that are cost-effective. This implies two things. First, as referred to earlier in this chapter, it implies the parallel development of improved accountability processes that link formula funding, financial accountability, and educational accountability into a single framework. Second, it implies that developers of formula-based indicators of need will need to have available better information on the costs of implementing alternative intervention and prevention programmes or approaches that have been demonstrably and measurably effective in improving outcomes for students with supplementary educational needs.

With increasing sophistication in the use of data on the costs of programmes and interventions, on the characteristics of students and on their achievements over time, so there will be a need for parallel sophistication in the development and use of school management information systems and in the automation of data collection and analysis. The Victoria, Australia approach to formula-based funding for socio-economic disadvantage is a good illustration of the role played by information systems and automatic data collection. It was not possible to contemplate the approach that was finally implemented until all schools had in place a computerized management information system that involved standardized approaches to collecting and storing information on students' background characteristics, and until the system had implemented state-wide processes for auditing these data. A related need is for the development of

ways of displaying data that classroom teachers and school leaders can readily understand, and associated training sessions for teachers to give them confidence in interpreting the results for their school in relation to aggregated data from other schools with which they might legitimately be compared. Central to making data more interpretable is the development of software to generate graphical displays.

The final area for further research and development that we would wish to signal is a shift in focus from macro-level issues associated with formula-based approaches to supplementary educational needs funding to schools, to the more micro-level issues associated with internal resource allocations and to monitoring the impact of what happens within schools and within classrooms. Little, if anything, is known of the extent to which funds allocated to schools actually reach the students for whom they were intended based on the needs assessment used to allocate the funds in the first place. Similarly, little is known about internal variations in cost-effectiveness of different programmes and interventions, or of ways of improving the cost-effectiveness of programmes for students with special needs. What is clear is that in the future schools will be expected to assume greater responsibility for meeting the learning needs of all students and especially those 'at risk' of not making satisfactory progress, at the same time ensuring that funds allocated are used to good effect and for the purposes for which they were intended.

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Chapter 6

Component 2: Curriculum enhancement and Component 4: School site needs

Peter Downes and Stephen Forster

Introduction

The earlier chapters of this book have established that one of the most commonly stated purposes of funding schools by formula is to ensure that schools are treated fairly. We have seen that well-designed formulae should distribute money to provide an agreed curriculum under equitable conditions. This would be relatively easy if all schools were situated in identical socio-economic, geographical, and climatological locations and housed in buildings designed by the same architect and built to the same specifications.

In practice, the physical conditions of schools vary enormously and therefore needs-based funding formulae have to be devised which attempt to identify factors which might be called 'site-specific' and to ensure that schools in disadvantageous settings are not penalized. In addition, some schools are requested to deliver curriculum options that are far more specialized and costly than the agreed national curriculum that is provided for all students. The supplementary costs of providing such 'enhancements' to a standard curriculum also must be addressed in a funding formula.

These two aspects of formula funding cover two of the main funding components described in *Chapter 3*. Curriculum enhancements are covered by Component 2 which includes funding adjustments for specialist teachers and non-teaching staff, equipment, materials, and building costs. School site needs are covered by Component 4 which includes funding adjustments related to school site physical characteristics, school location, site running costs, and split-site or multi-campus establishments.

Before moving to a detailed discussion of these two components it is important to note that in the areas of curriculum enhancement and school site needs there is a need to adopt a cautious and realistic approach to formula funding. In particular, educational administrators need to be quite sure that the level of detail and sophistication of the formula does not require more work than the amount of money to be disbursed to schools justifies. In other words, a fund-holding

authority has to decide whether or not the technical work involved in producing a formula justifies the time and money that is spent on producing it. On the other hand it should also be pointed out that a heavy initial investment in creating a formula funding approach will save time in subsequent years, when funds can be distributed via the formula without having to undertake detailed site-by-site negotiations.

Component 2: Curriculum enhancement

In many school systems every student attending a state-funded establishment has right of access to an agreed national curriculum. This is usually defined in terms of specific subjects to be studied, sometimes for specified periods of time, or to specified achievement levels. At the same time, some educationists and politicians argue the case for greater diversity among schools in order to meet the differing talents and abilities of students, and others extend this call for diversity by saying that schools should be funded to a level which allows them to meet the demand for curricular diversification within a single educational establishment. Initiatives that are taken by individual schools to offer specialized programmes outside, or in addition to, mainstream school subject areas are often referred to as curriculum enhancements. This may include either offering different subject areas or making substantial changes in the organization of the school with the purpose of offering different ways of delivering a mainstream curriculum.

The enhancement of a school's curriculum usually has major resource implications that can be analyzed according to five main cost categories: teaching staff, non-teaching staff, equipment, materials, and buildings.

(a) Teaching staff

Since teaching staff costs account for between 70 and 80 percent of the costs of running a school, it is in this area that the impact of a decision to enhance the curriculum will be mainly felt. The curriculum may be 'enhanced' by a school in many ways. For example, a school may take action to change educational processes, or to specialize in a particular subject, or to reform school organization.

(i) *Educational processes* might be changed by splitting a class of, say, 30 into two groups of 15 – thereby giving each student twice as much access to teacher help and also resulting in increased teaching requirements.
(ii) *Specialization* in a particular school subject could be addressed by giving more time within a time-limited curriculum to a particular subject such as technology, languages, or mathematics.

If these subjects normally have a below-average teaching group size (for example, technology groups of 20 in a school where other subjects are taught in groups of 30), this will increase the teaching cost budget.

(iii) *School organization* may be adjusted in order to allow a lengthening of the school day so that particular subjects receive more time. The precise additional costs incurred here will depend on the nature of the contracts of the teaching and non-teaching staff.

For each of these examples, an activity-led funding analysis in order to cost the staffing of a school (see discussion of Component 1) will enable a unit cost for every lesson to be established without difficulty. Changes which add extra teaching groups within, before, or after the normal teaching day can then be translated into extra staffing costs.

(b) Non-teaching staff

Non-teaching staff costs vary from subject to subject. The pattern of use of support staff such as classroom assistants, technical assistants, and administrative assistants also varies from country to country. In some school districts in the United States, teachers of science will have small teaching groups and well-equipped laboratories – but no technical assistance because they are usually given a lighter teaching load to enable them to do the preparation required for practical work. In the United Kingdom, on the other hand, the trend since the introduction of local management of schools has been to employ more technical support staff to take routine preparation work away from 'expensive' teachers.

An enhanced curriculum in areas where support staff are used will probably increase costs if extra hours are needed. In some cases, it may be possible to absorb the extra demand by better organization of the existing workforce by carrying out certain routine tasks (like the preparation of chemistry experiments) in bulk.

(c) Equipment costs

Equipment costs affect all subject areas to a greater or lesser extent. Most obviously, a school with an enhanced curriculum in information technology will need more computers so that student access is greater. The cost of this access can be calculated in terms of minutes per student of computer availability. A school with 1,000 students may have 100 computers which are available for 25 hours per week (assuming 100 percent efficiency of

usage and maintenance outside curriculum time). This would give each student a notional 2.5 hours of access to a computer each week, which would in turn represent 10 percent of the teaching time. An enhancement of information technology by doubling access time to 5 hours per week would require the purchase of a further 100 computers. To this capital outlay must be added installation costs and maintenance. In this case there would therefore be implications both for the school's capital investment budget and revenue budget.

(d) Materials costs

Materials costs, as distinct from the costs of equipment, refers to consumables (chemicals, plastic, wood, paint, depending on the subject) and to books, paper, reprographics, and software. The discussion of Component 1 noted how learning resource costs weighted by subject can be included in an activity-led formula. An enhancement of a particular aspect of the curriculum will increase the materials costs and the implications can be assessed by adjusting that element of the overall formula.

(e) Buildings costs

Buildings costs may well be greatly increased by an enhanced curriculum. Once again we need to counter-balance capital and revenue costs (see below). An investment in new buildings (for example, extra science laboratories) may come from a capital budget but the extra running costs of the buildings (for example, heating, lighting, caretaking and maintenance) will come from the revenue budget.

The use of an activity-led model which disaggregates the costs of running a school down to a level of fine detail makes it possible to cost out the implications of curriculum enhancement before its implementation.

Component 4: School site needs

School site needs vary a great deal among schools within a single system of education for many reasons – some of these are connected to the physical characteristics of the school building and its location, and others are linked to historical patterns and attitudes related to what is 'adequate' in terms of lighting, heating, cleaning, etc. The relative amounts of funding across all of these sources of cost may also vary with the 'age' of a school system and whether there has been a recent expansion or shrinkage in enrolments.

(a) School size

During the discussion of Component 1 it was noted that activity-led funding formulae are driven mainly by the number of students in a school. Economies of scale tend to favour larger schools in a system and to disadvantage smaller establishments. Exactly how the concepts of 'small' and 'large' are defined will vary from country to country, and there will be other external pressures which depend on wider social policies. For example, a small school, perhaps situated in a small village, may not be able to provide its students with an appropriate range of opportunities without a high level of extra funding. The closure of the school and the consequent transfer of students to other schools may provide the students with a better education and the extra transport costs may be less than the expense of keeping them in their original school. To this extent, the education budget would be giving better value for money. On the other hand, the closure of a school in a small village might rob that community of its only public meeting place and the focal point of the community life of the village. In cases like this general social costs related to school closure need to be weighed against possible economic and educational benefits – and there is no simple answer to this kind of dilemma.

Within an overall policy which states that, wherever possible, children should be able to attend their nearest school, factors such as demographic change and parental choice can bring about a wide range of school sizes within an education authority district. A policy to compensate for school size and a formula to protect children in smaller schools is essential if the criterion of equity is to be achieved. It is important to stress that the formula should protect the interests of children, and not the school as an establishment, since the children are the first priority of the educational process and not the school buildings.

There are two main, but quite different, approaches that are applied by Ministries of Education in order to protect small schools.

(i) *Lump-sum approaches*. These consist of funding all schools with a lump sum which is intended to cover the irreducible fixed costs faced by all schools of whatever size, topped up by a per-student element which recognizes that school costs increase according to the number of students on roll. The exact balance between the two elements of funding is ultimately a political rather than a technical decision. The larger the lump sum, the greater the protection to small schools. In order to prevent local authorities from 'over-protecting' small schools, central government may specify that at least 80 percent of each school's budget should be distributed by the student number element.

(ii) *Specificities of 'minimum viability levels'*. As an alternative to lump-sum approaches, it is sometimes possible to define the minimum viability level for a notional school. For example, a secondary school for students aged 11-16 years may not be able to offer its students access to the National Curriculum unless it has at least 90 students (three classes of 30) in each grade, giving 450 in the school as a whole. Below this number, it may not be feasible to provide enough specialist teachers to deliver the curriculum or to offer a range of options in Grades 10 and 11 which will give students equality of access comparable to students in larger schools. Schools falling below the minimum viable number need to be given 'curriculum protection', in the form of extra funding needed to bring them up to viability level. This might mean an enhanced student weighting which would increase as the number on the roll decreases. In the example given above, students in a school of 430 might receive a curriculum protection factor of 10 percent, increasing to 15 percent at 410 and 20 percent at 390. The great difficulty for a funding authority in this area is to know where to draw the line by closing a very small school. It is at this decision point that other external factors may well come into play.

(b) School location

The location of a school can have major implications for the cost of running a school. An isolated school will need to bear extra costs related to the transportation of equipment and teaching materials and extra expenses will be incurred whenever the school programme requires that students should have access to facilities such as museums, theatres, libraries, etc. Such schools may be forced to accept the extra travel costs associated with obtaining services through occasional visits by specialist teachers and non-teaching staff. In addition, extra costs may arise because the cost of repairs and materials may be higher due to transport costs, and also because there are additional communication costs if almost all telephone calls are at long-distance rates.

In Australia, where isolation clearly has a major impact upon educational opportunities, considerable effort has been put into defining a range of measures that attempt to estimate the supplementary educational costs of isolation. These measures have ranged from simple distance measures (for example, the distance of a school from the next stage of education) to more sophisticated census-based approaches whereby scales of isolation are constructed from estimates of the population density of the catchment zone (Ross, 1992). The

most comprehensive attempt to date in this area has been the extremely innovative research conducted by Griffith (1997), which has aimed to provide a validated cost scale that can be applied to Australian schools according to their degree of isolation. Griffith's approach has been to the influence funding decisions by providing accurate figures for the costs of delivering a 'basket of educational services' to 24,000 census districts throughout Australia.

The problem of isolation is given great importance in certain Australian states and territories (for example, Queensland and the Northern Territory) – but much lesser attention in the small states such as Victoria. In contrast to Australia, isolation is not perceived as a major issue in funding formulae developed by local education authorities in the United Kingdom. In New Zealand some acknowledgement is given to isolation through the use of a distance measure (more than 30 kilometres from a town of 2,000 or more persons) which attempts to recognize the higher costs of school supplies for isolated schools.

(c) Site running costs

The relationship between *revenue expenditure* and *capital expenditure* is critical to this area of work. Revenue expenditure is what a school spends each year on providing its curricular programme to a defined population of students in a particular set of buildings. Capital expenditure is incurred by the owner of the buildings (local authority, central government, school trustees, faith community, private enterprise, etc.) to maintain or expand the buildings.

In an ideal world of generous funding, a capital works component could be built into the annual payments to schools. Schools would have to be allowed to save up for major repairs or extensions and this could mean that they might hold substantial public funds in an investment account, a situation which generally does not satisfy auditors of public expenditure. The owners of buildings would also have to ensure that money allocated for a capital programme was actually used for that purpose, otherwise they could see the quality of their buildings deteriorating over a period of a few years. This level of oversight implies a central buildings inspection team and raises a number of questions about ultimate responsibility.

The most usual solution, especially in a period of tightly constrained budgets, is not to devolve capital expenditure to schools. No individual school would have enough in its budget to carry out any major work and, in any case, the technical expertise required to manage a capital programme, both in terms of financing and execution, is best held centrally and can be seen as part of the 'added value' of belonging to a local authority or education system.

A further difficulty lies in the moment of transition from one funding system to another. If, say, a formula for funding the heating of a school is based on previous patterns of expenditure such as the year preceding devolved funding, there is a perverse incentive for principals to spend as much as possible in order to raise the base for future funding.

In practice, the boundaries between revenue and capital are not always easily drawn and many site-specific issues, such as heating and maintenance, are closely linked to levels of previous, current, and possible future capital expenditure. Local Management of Schools schemes in the United Kingdom attempt to distinguish between *structural and external maintenance* on the one hand and *internal maintenance* on the other. While it is seen to be reasonable for site-based managers, or principals, to exercise control over the latter, it is thought to be unreasonable for them to take responsibility for the former. A school's budget cannot easily bear the major expense of capital works, yet neglect of capital works may increase the revenue costs for a school. For example, failure by the owner of the school buildings to maintain a heating system supplied as part of the capital programme may increase the costs of heating the school which fall to the revenue budget. Another example, the installation in a capital works programme of badly designed windows may lead to breakages, the cost of which has to be borne by the school's revenue budget.

(i) *Maintenance costs*. In discussing maintenance costs, a crucial distinction has to be drawn between 'internal maintenance' and 'external maintenance'. Internal maintenance covers those aspects of maintenance that can, in general, be planned as part of an annual budget strategy and do not involve very occasional major capital expenditure. The name is therefore something of a misnomer as there are many items of maintenance inside buildings which do not fall within the category – at least according to the definition enshrined in the United Kingdom legislation. Examples would include major electrical rewiring or significant changes to plumbing systems. There are also some matters related to the exterior of buildings, such as broken windows, which do fall within the definition of internal maintenance. In general, though, internal maintenance refers to those aspects which the tenant of a building would be required to be responsible for, such as internal decoration, repairs, flooring and so on.

External maintenance covers areas of significant capital expenditure that are often related to the age and previous maintenance history of a building and over which a local manager

can exercise very little control and would very rarely have sufficient budget to make an impact. This would include issues affecting the structure of buildings themselves (for example, subsidence or the 'concrete cancer' in some 1960's buildings), failure of major building elements (for example, flat roofs leaking or boilers needing replacement) and proactive work to prevent building deterioration (for example, external painting). As a rule these can be described as the kinds of responsibilities that the owner of a building would have so as to ensure reasonable and safe conditions for the tenants.

The large, irregular, and often unpredictable nature of external maintenance expenditure indicates that it is difficult to find a satisfactory way to delegate funding. Experience in England and Wales shows that the majority of schools would not want this responsibility, which they regard as an unacceptable burden, particularly in many areas where there has been a history of poor maintenance due to restrictions in government funding. External maintenance was specifically excluded from Local Management of Schools schemes in the legislation that governed their structure (Education Reform Act, 1988) with the exception of a small category of Church schools (Voluntary Aided Schools and Special Agreement Schools) where the buildings were already owned and maintained by the Church authorities. Those schools which opted to leave local authority control and become 'Grant Maintained' schools were directly funded by the government and did take over all responsibility for their buildings. A government agency, the 'Funding Agency for Schools', provided grant aid for exceptionally large repair bills that individual schools were unable to meet. In the last two years before Grant Maintained school status was abolished, they were given a capital grant related to the number of students and encouraged to save up over a number of years to pay for capital improvement.

Internal maintenance costs, as with external maintenance costs, depend to some degree on the construction of school buildings and the quality of maintenance before they were taken over by local management. For example, many older buildings have large areas of plaster walls that need regular repainting (but may not have been painted for some time due to local authority budget difficulties), whereas modern buildings often have a maintenance-free brick finish to walls. On the other hand, the solid woodwork in buildings from the Victorian era needs less repair than the much weaker laminated wood used for doors in modern buildings.

It is therefore very difficult to include a reliable formula factor relating to internal maintenance in schemes of delegation,

given the variable condition of the buildings. In practice most schemes in England and Wales use a combination of floor area and numbers of students weighted for age to delegate this funding, whilst others use only the age-weighted student numbers. As we shall see with cleaning costs, this means that more funding is allocated for the oldest students when the evidence is that it is younger students in the secondary sector who cause the most maintenance problems. This difficulty could be overcome if the age-weighted student (AWPU) factor was itself constructed from the cash allocation needed for every individual item of expenditure.

The standard indicators used in funding maintenance costs are space measurements and student numbers. In some schemes, the main indicator is the measured area of classrooms, corridors, common spaces, grounds, paths, etc., to which may be added a student number factor. In some cases, the student number indicator may be weighted by the age of the student. The 'wear and tear' factor increases as students get older, reaching a peak at 15/16 years and then diminishing up to the age of 18.

Funding authorities which have buildings dating from many different times introduce an indicator for the age of the building, but this is not as straightforward as it might appear since some older buildings, for example of the pre-1940s, are less expensive to maintain than buildings from the 1960s and 1970s, which were built to a lower specification at a time when a rapidly rising student roll demanded an accelerated expansion programme. More recent buildings have better design features such as double-glazing and insulated roof-space and, in some cases, the funding authority may take this into account when devising its funding formula.

When moving from centrally funded maintenance to a funding formula for distributing resources to schools to which site-based management has been granted, the usual approach is to take the preceding three years of historical expenditure for all schools and set it against indicators such as student numbers, space measurements and age of buildings. By using regression analysis, a norm can be established which forms the basis for the future formula. Schools whose spending pattern for premises varies widely from the norm may need individual guidance and specialist help if they are not to be greatly disadvantaged by the application of formula funding.

The experience of funding authorities which have moved into formula funding for maintenance (cleaning, grounds, repairs, internal decoration) has been that, when schools receive funding by formula and are then responsible for paying the actual costs, attention to economy of use is much higher. The

incentive for schools to reduce maintenance costs is greater when any savings remain within the school's delegated budget and can be used for what are perceived to be more directly educational purposes. At the same time, schools with responsibility for their own premises have come to realize that it is a false economy to skimp on maintenance work.

(ii) *Energy and services costs (heating, lighting, and water).* In much of the discussion associated with the introduction of Local Management of Schools in the United Kingdom, energy costs often receive more attention than they deserve, considering how small a proportion of the total education budget that they represent. Nevertheless, such cost sources are easily understood and are often used as an example of how local management can make a difference. Unfortunately these viewpoints on costs occasionally result in 'effective principals' being portrayed as constantly monitoring their school's energy use, fitting low-energy light systems, encouraging lights to be switched off when not needed, improving their school's insulation, monitoring heating systems, and ensuring that the absolute minimum of water is used to flush the boys' urinals.

In the United Kingdom it was a concern about energy costs that provoked the first discussions between principals and Local Education Authorities about 'budget generation' – the process by which the Authority decided how much money in total to give to its schools. In the past, before the commencement of Local Management of Schools schemes, the budget for energy use had simply been the previous year's expenditure, less any savings due to investment by the local authority (for example by installing new energy-efficient boilers). If this approach had continued, savings in energy use by schools one year would have directly resulted in less money being given to schools the following year. Therefore the local authority had to agree to freeze the position as it was in 1988 and keep the element in its budget for energy consumption constant, allowing only for the effects of inflation (or deflation, as it has been in recent years in the United Kingdom).

We have already mentioned the interaction of capital and revenue costs and the situation outlined above provides a good example. If a local authority, as owner of the school buildings, decided to invest in an energy-saving scheme at a school, it no longer received any direct benefit to its central budget. This meant that funding for such schemes was reduced just at the time that national and international pressure was building up to conserve energy. A solution was found in the form of 'partnership schemes' where 'good housekeeping loans' were made to schools. These were interest-free loans with the rate of repayment set at

approximately the saving to the school. Therefore the individual school was enabled to proceed with schemes in a way that was cost neutral until the loan was paid off and then the school gained the whole benefit in its budget. The success of this scheme was such that it was extended to cover other major expenditure that would benefit the school in the long term – for example, replacing paper towels in toilets with warm-air hand dryers and providing more modern telephone exchanges.

The selection and application of indicators of energy and services costs for schools is a complex task that needs to factor in the age, construction features, and previous history of school buildings. To illustrate, the rapid change in building regulations in the last few years in the United Kingdom with regard to the quality of insulation in new buildings means that a school with buildings just a few years older than another one, but identical in every other way, will have considerably greater energy costs. The worst buildings from an insulation point of view (and many other perspectives including maintenance costs) were built in the United Kingdom in the 1960s and early 1970s and so a school which has most or all of its buildings from this period will be at a severe financial disadvantage. However, under current legislation in the United Kingdom, it is not possible to make an allowance for these differences in schemes for formula funding.

If it were thought appropriate in countries with greater extremes of temperature, the conductivity of different materials could be accurately measured and therefore it would be possible to calculate the level of insulation in a school in determining the funding it should receive for its energy needs. A strong counter-argument would be that this would remove some of the incentive for the manager to use funding to improve the energy efficiency of the school.

(iii) *Cleaning costs.* There are usually two main indicators used to assess cleaning costs: the number of students in the school and the area of floor to be cleaned, with the latter being the most significant. Other factors can include the cost and availability of labour (typically more expensive near larger cities), the nature of the school grounds, and the weather. A lot of mud near the school and rainy weather can have an overwhelming effect.

The effect of the framework of legislation in the United Kingdom has had an interesting effect on the way cleaning costs are generally funded. The insistence on the majority of funding being based on a figure that is proportional to the number of students *weighted for age* means that cleaning costs are usually included in that part of the formula. There is no evidence that it costs more to clean up after a Grade 13 student than a Grade 7 student (representing the oldest and youngest grades in

United Kingdom secondary schools). Indeed the opposite is more likely to be true.

There is considerable debate as to whether or not school floor area should be an indicator used to delegate funding, though clearly it is significant in the case of cleaning costs. Those local authorities in the United Kingdom which use student numbers alone, do so in order to encourage schools not to retain space that they do not need. This is a response to considerable government pressure on local authorities to eliminate surplus places in schools.

(iv) *Other school site costs.* These can be many and varied and are very difficult to incorporate into formula funding in a meaningful way. They can be summarized as exceptional factors beyond local management control that have a significant adverse effect on site costs. Some examples follow.

Swimming pools: Heated indoor swimming pools can add a major cost element to the running of a school. These have often been placed on school sites as a result of strategic planning by a local authority rather than for the specific use of the school and therefore it may be appropriate for schools to be given a contribution towards the cost of running them (though, if possible, schools should also be encouraged to raise income from them).

Dual-use facilities: These are facilities jointly owned with the local authority and not used exclusively for the school (for example, large sports halls or libraries). Funding arrangements need to make sure that the school is not charged with an unfair share of energy, staffing, or maintenance costs.

Special-needs Units: The local authority may designate certain schools to house special units for students with learning difficulties, behavioural difficulties, or physical disabilities. These can result in extra staffing costs, extra maintenance costs (particularly in the case where a school has a significantly larger area than it would otherwise have, to make room for children in wheelchairs) and extra energy costs (for example, if it has a hydrotherapy pool). Arrangements for funding must make sure the school is not disadvantaged.

External occupancy of site: The local authority or others may use part of the site for offices, to house facilities that serve a number of schools (such as grounds maintenance teams) or as a community facility. The school must be reimbursed for the direct cost of any such activity.

Community schools: A number of schools in the United Kingdom are designated as 'community schools'. This means that they have particular responsibility for providing educational and social activities for members of the local community. These

usually take place outside school hours, though many schools try to provide some activities during the school day if they have room. Local authorities supporting this kind of activity need to ensure that schools are fully reimbursed for all costs. It is normal to repay direct costs (energy, cleaning, and caretaking) to the school – indeed it is a legal requirement – however, hidden costs, such as increased maintenance and the fact that the school is unable to make a profit by hiring out its own facilities when being used by the community, are often ignored.

Abnormal turnover of students: Some schools experience a very high turnover of students simply because of their locations. Three examples: school A has all the local authority temporary accommodation for homeless people in its catchment area; school B is based in the area where families of graduate students at a large university tend to live; school C serves an armed forces base where soldiers are regularly moved to other postings, taking their families with them. All of these schools suffer to an extent from disturbance to teaching and normal routines. The impact would probably be greatest in school A, which would have to meet a wide range of emotional and behavioural needs. It is difficult to establish the differential costs of the different types of turnover that have been listed above – and therefore the tendency has often been to try to absorb this area into student supplementary cost indicators.

(d) Split-site or multi-campus establishments

Split-site establishments exist in a number of education systems for a variety of reasons. For example, they became very common in England and Wales in the 1970s following the drive to remove secondary selection and replace grammar schools and secondary-modern schools with comprehensive schools. The very limited funding made available by central government for this process often forced the amalgamation of several schools into single establishments. In some cases this process involved very little more than changing the name-board on the front of the schools and replacing two principals with one. The nature of a split-site school therefore varies: at one extreme there is the relatively easy-to-manage situation where both predecessor schools have been built on one campus and so, strictly speaking, all the buildings are on the same site (though often separated by fields and a walk of several hundred metres). At the other extreme, one school may consist of buildings on three sites, each one being a mile or more from the other two. Such a situation raises multiple and significant cost issues to be overcome by the school management.

A split-site dimension as a strictly defined element within a funding formula can cause considerable problems related to establishing a sound definition of exactly what is meant by a 'split site'. A simple historical definition may suffice (for example, 'formed by amalgamating two or more schools') but historical definitions may be precluded by the funding rules imposed by government, as they were in the United Kingdom in 1988. In this case it can be difficult to establish an objective definition and this was, indeed, the subject of major debate amongst principals at the time of implementation of Local Management of schools in the United Kingdom. If separation of buildings was the major criterion, there were some schools that had deliberately been built with buildings some distance apart that would have come within the definition. In one local education authority, for example, it was decided only to give extra funding to schools that had buildings separated by a public road, though even here there was a debate as to whether or not a busway constituted a public road.

The extra costs of managing a split-site school are spread across a wide spectrum. These are often extra costs associated with the need to provide additional staffing (all sites may need a separate reception, caretaker, or security staff simply because of their separation). There are often additional costs caused by timetable or pastoral constraints because the movement of staff and students between sites may result in requiring the employment of additional teaching staff. Where there are large distances between sites, extra costs can arise from transportation and communication costs, and major increases in costs can arise because it is necessary to recognize that the management of faculties or curriculum areas requires close day-to-day supervision which can only be achieved in a split-site school by having more senior staff.

Although a number of Local Education Authorities in the United Kingdom have tended to abandon split sites for their Local Management of Schools schemes, some still retain it. A recent study undertaken for the City of Westminster by Cambridge Education Associates revealed remarkable discrepancies in the effects of the different formulae applied to such schools. A particular school in the study, moved hypothetically from one local education authority to another within London, would receive split-site funding varying from £5,200 to £415,895. This suggests that a genuine needs-based analysis has not been carried out and that the figures have been arrived at by an estimate of historical precedent or by inspired lobbying by the principals of split-site establishments.

One useful approach for deciding how much should be spent on a split-site school would be to calculate what it would cost to run both sites as separate schools within the normal funding formula. Probably

one or more of the sites would benefit from the small-site protection factor, usually conveyed through a lump-sum allocation, or through a factor known as 'curriculum protection', or a combination of both. If the cost of running the school as one split-site establishment is greater than it would be if the two or more sites were separate schools, then clearly the generosity of the split-site funding formula has to be carefully scrutinized.

Awareness of the extra running costs (as distinct from other management, discipline, and curricular problems) of split-site schools has become influential in guiding local authorities in the use of scarce funds for capital works. Uniting schools on a single campus has therefore become a priority in many areas.

Conclusion

This chapter has examined two of the main four components that are employed in most approaches to the formula funding of schools. The first, curriculum enhancement, was focused on allowing more diversity in schooling by permitting some schools to offer specialized programmes or curriculum delivery techniques that fall outside the mainstream offerings and that usually involve supplementary costs. This component was broken down into elements concerned with teachers, non-teaching staff, equipment, materials, and building costs.

The second, school site costs, concentrated on cost differentials that were not fully under the control of school managers: school size, school location, site running costs, and split-site or multi-campus establishments.

The main message that emerges from this chapter is that the construction of funding formulae to cover these two components is a complex business which must be centred around a careful and pragmatic analysis of cost dimensions that are often influenced by forces operating outside the schools themselves.

It is clear that improvements in the quality and rationale for formula funding approaches in this area require more detailed study. An appealing research approach here would be to study Components 2 and 4 in more depth by attempting to 'control' for Components 1 and 3. This form of analysis would require intensive study of groups of schools that are identical in size, that have students in the same age range, and that serve similar communities – but that are housed in buildings of different types, that are in different locations, and that offer different curricula. Such a study could seek to quantify more precisely the impact of site and curriculum enhancement components on the resources available for teaching and learning.

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Part III
Case studies in the application of formula funding

Chapter 7

Case study 1: Formula funding of schools in Australia

Brian J. Caldwell and Peter W. Hill

The origins of formula funding

The Commonwealth of Australia is a nation of about 18 million people. It is comprised of six states and two territories, the latter having self-governing arrangements that fall short of full statehood. Education in Australia is the constitutional responsibility of each state, but the national government (Commonwealth) has an important influence because it is a major source of funding for education. Each state system of public education is managed as an independent entity, although it may be organized for administrative purposes into regions. There are no local education authorities, as in the United Kingdom, or school districts, as in the United States of America.

Expenditure on education

The main source of funds for elementary and secondary schooling in Australia is income tax collected by the Commonwealth government and subsequently passed on to state and territory governments through general and specific-purpose grants. In allocating funds among states and territories, the Commonwealth government takes into account the actual costs of provision in different states. However, after receiving Commonwealth funds, the states and territories have considerable discretion over the ways in which they will spend on school education. The states and territories raise additional revenue through an assortment of taxes and other charges.

The non-government school sector in Australia is substantial, with some 30 percent of students attending these schools. The non-government sector includes a substantial number of systemic Catholic schools. Their revenue is derived from tuition fees, state or territory governments, and to a greater extent as far as public funding is concerned, the Commonwealth government.

Allocation of resources to schools

Traditionally, until the early 1970s, education departments in states and territories made most of the important decisions on the

allocation of resources to schools. Staff were allocated according to a simple formula based on size and level of schooling and supplies and equipment were allocated or requisitioned along similar lines. Voluntary contributions from parents and local fundraising were the only sources of cash.

A challenge to these centralized arrangements was offered in an influential report by Freeman Butts, visiting Australia from Columbia University, New York, in his critique of assumptions underlying Australian education (Butts, 1955). He challenged the prevailing view that equality should mean uniformity and he noted the absence of choice, with strong government controls operating at the expense of community empowerment.

However, it was not until the early 1970s, following the report of the Interim Committee for the Australian Schools Commission, that challenges to centralized control of schooling were placed on the agendas of all agencies involved in the functioning of Australian schools. This Committee urged less centralized control over the operations of schools so that responsibility for decision-making could be devolved as far as possible upon the people involved in the actual task of schooling, in consultation with the parents of the students taught and, at senior levels, with the students themselves (Interim Committee for the Australian Schools Commission, 1973).

A major initiative of the Australian Schools Commission was the establishment of a series of special-purpose grants, many of which were to be disbursed directly to schools on the basis of submissions prepared by staff and members of the community. Throughout the 1970s and 1980s the number of such grants increased rapidly, supplemented by others at the initiative of state governments. The de-zoning of school attendance also commenced in certain states in subsequent years, with major efforts being made to empower the school communities through structures such as school councils.

In the 1990s, a successor body to the Schools Commission, the Schools Council of the National Board of Employment Education and Training, enunciated similar values, making them more explicit with respect to devolved responsibility for school management and the allocation of resources. The Schools Council believed that school communities should be able to demonstrate flexibility to respond to changing circumstances, and that this would require schools to have the capacity to modify their resourcing arrangements in order to increase learning opportunities (Schools Council, 1993).

Emergence of a variety of needs-based funding mechanisms

By the early 1990s, the various school systems in Australia had taken rather different pathways towards needs-based funding mechanisms. In the following discussion a brief summary will be presented

of the three illustrative examples of how these mechanisms emerged over the 20 years until the early 1990s. These include the Tasmanian Government school system – which was the first state to move in a comprehensive fashion to such an approach; the Queensland Government school system – which remained relatively centralized, with intentions to move to a more student-centred approach from 1998; and one Catholic school system in the Archdiocese of Melbourne – which has become moderately decentralized.

(a) Tasmania: Formula funding within a decentralized administration

Tasmania is the smallest of the Australian states; however, it moved relatively quickly to decentralize funds to schools following the early work of the Australian Schools Commission. Indeed, this state furnished the model for self-managing schools that has proved helpful in several nations (see Caldwell and Spinks, 1992; 1988). By 1998, funds to cover almost all non-staff expenditure were decentralized to schools. The School Resource Package, for which there is high flexibility as far as deployment is concerned, has four components: General Support Grant, Maintenance Grant, Energy, and Student Assistance Scheme. The general support grant is distributed as follows: 67 percent per capita, 25 percent educational needs, and 8 percent rurality needs, with relativities across sectors being 1.00 primary (K-6), 1.25 years 7-10, and 1.45 years 11-12. A maintenance grant is distributed: 40 percent building-needs index, 45 percent per capita, 7 percent educational needs, and 8 percent rurality needs, with relativities being 1.00 for primary K-6 and 1.60 for secondary (7-12). The educational needs of Tasmania's schools are measured on a scale entitled the Ross Index of Educational Disadvantage, taken in association with a measure of the proportion of students in receipt of an income-tested government assistance allowance.

The statistical methodologies required to produce the Ross Index of Educational Disadvantage was developed in 1983 by Kenneth Ross at the University of Melbourne (see Ross, 1983). Ross developed the index using 44 variables derived from census data and these were reduced to six social profile dimensions to determine a measure of socio-economic disadvantage in terms of capacity of students to take advantage of educational facilities: occupation, income, accommodation, education, family structure, and tenancy. A measure of the index was obtained by mapping each school's catchment area for students in year 4 (primary) and year 8 (secondary) on to the census data collection areas used by the Australian Bureau of Statistics. The outcome was a scale of 16 levels of socio-economic disadvantage.

An additional indicator of need for Tasmania's isolated rural schools was determined by calculating the distance of schools from a major city and the size of the centres where schools were located, with relativities applied according to sector of schooling.

These socio-economic and isolation indicators were applied in association with the percentage breakdown of funding across the four components of the School Resource Package in order to generate a global budget for each school. All entitlements for both teaching and non-teaching staff were allocated using this approach.

(b) Queensland: Resource allocation formulae within a centralized administration

Queensland, by contrast, offers little management flexibility to schools within a relatively traditional and centralized approach to educational administration. All teaching and non-teaching staff are allocated by a number of resource allocation formulae that reflect stage and type of schooling, with variations to meet local circumstances achieved by a small measure of regional discretion. The only flexibility allowed schools in terms of fund management comes through the School Grant that covers supplies, equipment, minor repairs, maintenance of facilities, and professional development. Queensland's Leading Schools programme took effect in 1998 with the larger schools in the state having an opportunity to plan the allocation of a larger budget, with more discretion at the school level. It is intended that this will be guided by a formula that includes a large needs-based component. Preliminary design of a funding formula commenced in early 1998. A change in government in mid 1998 resulted in abandonment of the Leading Schools programme but the development of needs-based formula funding approach continues.

(c) Victoria's Catholic schools: Funding formulae within a moderately decentralized administration

Approximately 30 percent of all Australian students are educated in non-government schools and most of these are in systems of Catholic schools. No account of efforts to implement needs-based funding under conditions of decentralization would be complete without reference to approaches in such systems. The model adopted by the Catholic Education Commission of Victoria is based on a commitment to promoting equality of opportunity.

As in Tasmania, and formerly in the government schools of Victoria, the resource model in its application utilizes the Ross Index of Disadvantage. All primary and secondary schools receive a

total budget that is guided by placement on the 16-point Ross Index. Amounts are retained centrally for such expenditure as school support, teacher development, and long-service leave. Of particular interest is the manner in which State and Commonwealth recurrent grants are combined and provided to the schools, from which is deducted an expected local contribution of private income. This last item is essentially a fee paid by parents, also determined on the 16-point scale, with provision for exemption for parents unable to pay.

Formula funding of schools as the centrepiece of school management reform in the government schools of the state of Victoria

The state of Victoria has a population approaching five million people and a government school system serving some 520,000 students in approximately 1,700 schools. Approximately 90 percent of the state's education budget is decentralized to schools, the highest proportion in Australia, and for this reason, warrants particular attention. It should be noted that Australia's largest State, New South Wales, planned to move in this direction in the late 1980s and early 1990s, but the determined opposition of the teachers' union to including a salaries component in the school budget meant that the scheme fell short of intentions.

(a) The 'Schools of the Future' reform

The Schools of the Future programme in Victoria is based on the creation of a system of self-managing schools within a curriculum and standards framework. Consistent with efforts to restructure the public sector, there has been a major down-sizing of central and regional education agencies, with a small but powerful strategic core 'steering' the system. While personnel for the most part remain centrally employed, there is increasingly a capacity at the school level to select staff and determine the mix of professional, para-professional, and support arrangements. Schools have their own budgets, in a process variously described as global budgeting or school-based budgeting, allowing discretion in deployment at the local level according to a mix of school and state priorities which, in Victoria, is embodied in a school charter that provides a framework for planning and accountability over a three-year period.

School reform in Victoria since the election of the first Kennett Government in late 1992 is arguably the most sweeping in any system of state school education in Australia since the establishment of government schools in the late nineteenth century (see Caldwell and Hayward, 1998, for an account of the design and implementation of Schools of the Future). Nearly 90 percent of recurrent expenditure

is distributed to schools in what is known in Victoria as a 'School Global Budget', which corresponds to the Delegated Schools Budget as defined in *Chapter 3*. In these and most other respects, the reforms in Victoria resemble what has occurred in the United Kingdom with the local management of schools and, to a lesser extent, New Zealand.

Coherence in a movement towards the concept of a 'school global budget' gathered momentum in Victoria in the early 1980s, with the introduction of programme budgeting and the empowerment of school councils to set policy and approve budgets, which amounted to about 5 percent of recurrent expenditure. These developments were stalled in the late 1980s by the opposition of teacher unions, and parent organizations and some bureaucrats but were moved forward in dramatic fashion by the Kennett Government in the early 1990s.

(b) Principles underpinning the formula funding used in Victoria

Having determined that about 90 percent of the state's budget for schools would be allocated to schools through a funding formula, the state government had to establish a framework for the development of the formula. To assist in this task, a committee was set up to advise the Minister for Education on appropriate funding formula methodologies for calculating the resource entitlement of individual schools. The recommendations in two reports (Education Committee, 1994; 1995; 1996) were accepted and implemented, with per capita core funding supplemented by needs-based allocations for students at educational risk, students with disabilities and impairments, students living in rural and isolation areas, students with non-English-speaking backgrounds, and students attending schools involved in various educational priority programmes. Of particular interest here are the eight principles for the construction of funding formula that the committee adopted from the outset.

(i) *Pre-eminence of educational considerations.* Decisions concerning which components, dimensions, and indicators to be included in the construction of the funding of formula should be guided solely by educational considerations.
(ii) *Fairness.* Schools with the same mix of learning needs should receive the same total resources.
(iii) *Transparency.* The construction and application of the funding formula should be clear and readily understandable by all with an interest, and the basis for the allocation of resources to each and every school should be made public.

(iv) *Subsidiarity.* Decisions on resource deployment within a school allocation should only be made centrally in unusual situations where the school is unable to take responsibility for decision-making.

(v) *Accountability.* A school that receives resources because it has students with a certain mix of learning needs should take responsibility for using those resources to provide programmes to meet those needs, and should be accountable for the use of those resources, including outcomes in relation to learning needs.

(vi) *Strategic implementation.* When new funding arrangements are indicated, they should be implemented progressively over several years to eliminate dramatic changes in the funding levels of schools from one year to another.

(vii) *Effectiveness.* Relativities among resource allocations across age and grade levels generated by the funding formula should reflect knowledge about school and classroom effectiveness.

(viii) *Efficiency.* Resource allocation decisions within schools should reflect knowledge about the most cost-effective ways of achieving desired outcomes in schooling.

The application of the above eight principles impacted strongly on debates that surrounded the establishment of the funding formulae. For example, the committee found that the size of current differential in allocations to elementary and secondary schools in favour of the latter was not warranted if the first principle ('pre-eminence of educational considerations') was taken into account. Accordingly, it recommended that allocations reflect needs at different stages of schooling (P-4, 5-8, and 9-12). In doing so, it paid particular attention to research on school and classroom effectiveness, especially in the early elementary years for outcomes in literacy, and in the middle years, for issues associated with student alienation. In another example, having expressed a view that there was no justification for reducing levels of funding at the secondary level, the committee invoked the principle of strategic implementation and recommended that efficiency and effectiveness be paramount considerations.

(c) Structure of the School Global Budget

The structure of the School Global Budget (Delegated Schools Budget) is summarized in *Table 7.1*. The Total Schools Budget, excluding capital expenditure, for school education in the 1995-1996 financial year, was US$979 million, of which a little over 5 percent, US$52 million, was spent on state administration, including the salaries of centrally and regionally based staff, administration and office

Table 7.1. Structure of the Total Schools Budget in Victoria for the 1995-1996 Financial Year (excludes capital expenditure)

Component	Funds (US$ million)	Percentage of total
School-Level Allocation		
Delegated Schools Budget		
1. Basic student allocation	710	72.5
2. Curriculum enhancement	23	2.4
3. Student supplementary educational needs		
(a) Disabilities and impairments	30	3.1
(b) Special learning needs	12	1.2
(c) Non-English-speaking background	13	1.3
4. School site needs		
(a) Rurality and isolation	9	0.9
(b) Premises	53	5.4
Total Delegated Schools Budget	850	86.8
Essential Exclusions Related to School Expenditure	77	7.9
Total School-Level Allocation	927	94.7
Non-School-Level Allocation		
Essential exclusions related to system administration	52	5.3
Total Schools Budget (excluding capital expenditure)	979	100

accommodation costs, and a proportion of the costs of operating the Board of Studies.[1] Thus a sum of US$927 million, or just under 95 percent of the total budget for school education, was made available for expenditure at the school level.

A further US$77 million, or 8 percent of total recurrent funds, was excluded from the Delegated Schools Budget, even though the costs were incurred at the school level. These funds were excluded because schools were not in a position to control their expenditure, or it was anticipated that there would be excessive variation of expenditure, or expenditure patterns were likely to be unpredictable (reflecting the principle of subsidiarity). These included the costs of busing students, which is the responsibility of another government agency; providing an education welfare allowance to poor families to assist them with unavoidable costs of schooling such as uniforms and books; meeting the salary costs of replacement teachers where

1. The Board of Studies is a statutory body responsible for setting curriculum and standards for students in government and non-government schools in all years of schooling from Preparatory to Year 10, and for assessment and certification of all students in Years 11 and 12, the final two years of schooling.

there was an extended absence of the regular teacher; and the costs of providing school support services, such as speech therapists and psychologists, who serve several schools. Essential Retentions thus total US$129 million, or 13 percent of the Total Schools Budget. This leaves a total of US$850 million, or 87 percent of the Total Schools Budget, for school education which was provided directly to individual schools as the Delegated Schools Budget.

The design of the funding formula

The components, dimensions, and indicators used in the funding formula for Victoria, Australia have been summarized in *Table 7.2*. In the following discussion an account is given of how these three aspects of the funding formula were developed.

(a) Component 1: Basic student allocation

For the 1995-1996 financial year, funding to cover salary and operating costs within schools was based on a formula which had differential weights for primary and secondary schools. The rate for secondary-school students was set approximately 43 percent higher than for primary students. Following extensive investigation of the actual pattern of internal allocation of funds within schools, and after consideration of research evidence regarding the educational needs of students in different stages of schooling, recommendations were made (Education Committee, 1996) to move in 1998 to a system of per capita funding of the core involving different weights according to stages of schooling (P-4, 5-8, 9-12) These weights would reduce the differential between funding levels for students in primary and secondary schools.

For the first two grades (Preparatory and Grade 1), it was recommended that per capita funding levels be at least 20 percent higher than in Grades 3 and 4. This is to enable smaller class sizes in the Preparatory grade (see Blachford and Mortimore, 1994) and the implementation of a comprehensive literacy strategy, including one-to-one tutoring in Grade 1 based on Reading Recovery (see Clay, 1991, 1993; Clay and Watson, 1982).

During the middle years of schooling, namely the final two years of elementary education and the first two or three years of secondary education, it was recognized that traditional models of elementary and secondary education provision typically fail to meet the educational and developmental needs of young adolescents (ACSA, 1996; Carnegie Council, 1989; Capelluti and Stokes, 1991; Eyers, 1993; Hargreaves and Earl, 1990). While an examination of 'best practice' approaches to middle schooling within the Australian

Table 7.2. Relationships among components, dimensions, and indicators in the development of a school funding formula in Victoria, Australia

Components	Dimensions	Indicators
Component 1: Basic student allocation		
1(a) Basic allocation	1(a) Total enrolment	1(a) FTE students weighted 1.00 primary and 1.43 secondary
1(b) Grade-level supplement	1(b) Grade-level differentiation	1(b) FTE students weighted differentially for P-4, 5-8, 9-12
Component 2: Curriculum enhancement		
	2(a) Special-purpose programmes	2(a) FTE students involved
	2(b) Foreign language programmes	2(b) FTE students involved
	2(c) Aboriginal programmes	2(c) FTE students involved
	2(d) Teachers' professional development	2(d) Number of teachers involved
	2(e) Within-school restructuring	2(e) Number of teachers involved
Component 3: Student supplementary educational needs		
	3(a) Socio-economic status	3(a) School score on indicator of socio-economic disadvantage
	3(b) Non-fluency in language	3(b) FTE students from non-English-speaking homes
	3(c) Low educational attainment	3(c) FTE students in 30% schools with most 'at risk' students
	3(d) Disabilities, impairments, etc.	3(d) FTE formally assessed
Component 4: School site needs		
	4(a) School size	4(a) Primary: FTE < 200 / secondary: FTE < 500
	4(b) Location (in terms of isolation)	4(b) Kms to town of 20,000 persons, Melbourne, and next school
	4(c) Site running costs (cleaning)	4(c) Interior area of school buildings
	4(d) Site running costs (maintenance)	4(d) Rating of building (area: 50%, materials: 25%, condition: 25%)

context (see, for example, Cumming and Fleming, 1993; McKenzie and Taylor, 1995) reveal no 'one best way', they point to certain common elements, of which the most important as far as funding levels are concerned involves interdisciplinary teams of teachers working with as few students as possible in as many subjects as possible. Accordingly, weights for Grades 5 and 6 may be at a higher level than those for Grades 3 and 4 to enable common planning time for teachers in the final two years of the elementary school. This means that the disparity in per capita funding for students in Grade 7 (the first year of secondary school) as compared to Grade 6 (the last year of elementary school) would be greatly reduced. A steadily increasing gradient in the weights for Grades 5 to 8 has nevertheless been built into the proposed set of weights in recognition of the increasing teacher assessment and preparation time involved, the increasing need for smaller class sizes and the additional operating costs in specialist areas such as science, during the middle years.

A significant feature of schooling for older adolescents and young adults in Grades 9 to 12 is the provision of a range of curricular choices, allowing students to explore and develop specific areas in depth and to pursue personal interests and strengths. Schools in Victoria typically provide a wide range of optional subjects in Grades 9 and 10. In the final two years (Grades 11 and 12), subject choice becomes even more significant as students select a relatively small number of subjects (typically six in Grade 11 and five in Grade 12) that they will study in depth. Choice and the availability of a full range of vocational pathways translate into significantly increased costs for schools. These costs arise from providing a comprehensive range of subjects despite relatively low enrolments in many, and the need for relatively small class sizes in others.

In addition, costs relating to tutoring, counselling, and remediation are higher than average during the later years of schooling, but increase significantly in Grade 11 and yet again in Grade 12 as demands increase for careers counselling, assistance with study skills, home support, monitoring progress, and one-to-one or small-group tutoring and guidance. Preparation and correction loads also increase dramatically as students prepare for their Grade 12 examinations. Finally, the higher costs of materials and equipment are also factors which result in increased levels of expenditure in Grades 11 and 12. These factors are reflected in weights for Grades 9-12, which might be 50 percent higher than those for Grades 3 and 4, for students in Grades 9 and 10, 80 percent higher for students in Grade 11, and 100 percent higher for students in Grade 12.

(b) Component 2: Curriculum enhancement

This component is known collectively in Victoria as Priority Programmes, and accounts for around 2.3 percent of total funding for school education. It includes funds for a number of state-wide initiatives and enables schools to participate in specific-purpose programmes including instrumental music programmes, languages other than English, programmes for Aboriginal students, school restructuring programmes, and so on. It also includes Teacher Professional Development Grant monies which are intended to re-skill teachers in areas that are related to new curriculum developments.

(c) Component 3: Student supplementary educational needs

Students with disabilities and impairments. Students with disabilities and impairments may attend a regular school or a special school. In 1996 there were 10,400 students (2.3 percent) receiving additional funding under this classification. The approach to funding students with disabilities and impairments has been to move towards additional resources to such students, following a detailed assessment using an *Educational Needs Questionnaire* which assigns individuals to one of six levels of funding, as shown in *Table 7.3.* At this stage, the above approach to funding has been implemented in regular schools only, but the approach is to be extended to special schools.

Table 7.3. Funding levels for students with disabilities and impairments in Victoria, Australia, 1996

Severity rating	Supplementary funding US$
Level 1 (mild)	1,280
Level 2	2,972
Level 3	4,677
Level 4	6,384
Level 5	8,083
Level 6 (very severe)	9,780

Students with special learning needs: This component targets students at risk of not making satisfactory progress due to family or other personal circumstances. It was also considered necessary to use predictors of low achievement rather than achievement measures themselves, since direct funding of low-achieving schools could remove the incentive to strive for high achievement.

Non-English-speaking-background students: This component is directed at schools with large numbers of recent arrivals to Australia who do not speak English and require specialist teaching. It is also directed at children from refugee families who, in addition to experiencing language problems, are likely to have experienced psychological trauma and a highly dislocated education. Weights for these students should reflect both stage of schooling and recency of arrival, with the highest level of additional funding going to recently arrived students in the later years of schooling.

(d) Component 4: School site needs

School size: In addition to the weights, there are size adjustment factors to reflect the additional costs of provision in schools with very small enrolments. This is particularly important in order to take into account small rural and isolated schools. Support for secondary schools with small enrolments is provided via an additional base allocation (not enrolment related) in Component 1: Basic Student Allocation.

Rurality and isolation: The geography of Australia, with its high concentration of population in the capital cities and its sparse rural populations, means that issues of rurality and isolation are of considerable significance. An important difference between rurality and isolation and other factors is that it applies to the total population of certain schools rather than to individual students. A further key difference is that the rationale for additional funding for rurality and isolation is related not to educational disadvantage, but rather to the additional costs of provision. This has been established in a number of studies, particularly those reported in Tomlinson (1995). Thus, additional funding for rurality and isolation is provided in recognition of the extra costs that are associated with curriculum provision, administration, and access to student support services.

In the context of Victoria, rurality and isolation involves a number of distinct elements which have been used to construct an index for non-metropolitan schools comprising an equally weighted combination of: distance in kilometres from the Melbourne metropolitan area; distance from the nearest provincial centre with more than 20,000 inhabitants; and distance from the nearest primary or secondary school, as appropriate, that is not eligible for funding as a rural or isolated school.

Funding for a given school is then determined as follows:

$$\text{Location Index Funding} = \text{US\$203} + (\text{Location Index Score} \times \text{Student Enrolment} \times \text{US\$23}).$$

Site running costs: This element of the School-Specific Site Factor represents just over 5 percent of total expenditure on school education. It covers a number of site-related costs such as the cost of contract cleaning, utilities (for example, heating fuel, water, sewage, refuse and garbage), maintenance of facilities and grounds and minor works. For each of these components, there are separate formulae, with details of each school site contained on a central, computer-based School Assets Management System.

This element is a per-school rather than a per-student payment, although contract cleaning allocations are made on the basis of a formula that takes into account both the total area to be cleaned and the number of students occupying the premises. The formulae used are sensitive to the particular nature of each site. For example, the formula for maintenance and minor works distributes 50 percent of the available funds on the basis of the school's facilities entitlement area, 25 percent on the type of materials used in the construction of the school buildings, and 25 percent on the relative condition of those buildings.

Current status of needs-based formula funding in Victoria

The Minster for Education implemented several of the recommendations in the final report of the Education Committee (1996). There was a substantial injection of funds for the early years of primary (elementary) schools to address priorities in early literacy, and this served to move relative weightings of resources closer to those recommended by the Education Committee. These funds were not, however, automatically included in the Delegated Schools Budget, since schools had to first demonstrate a need and plan for action in this area. Rather than move immediately to a new set of weightings in the middle years, as recommended in the report, the Minister focused on another recommendation, namely, to commission further research on resource requirements across these years. Taken together over the last five years, these developments represent a striking case of research-driven policy initiatives that have translated into a pattern of resource allocation that reflects the needs-based formula funding approach. In most other respects the recommendations and strategic intentions of the Education Committee have been adopted.

A short evaluative comment on Schools of the Future

In Victoria, Schools of the Future is the focus of a major investigation known as the Cooperative Research Project, established in early 1993 as a joint endeavour of the Department of Education, Victorian Association of State Secondary Principals, the Victorian

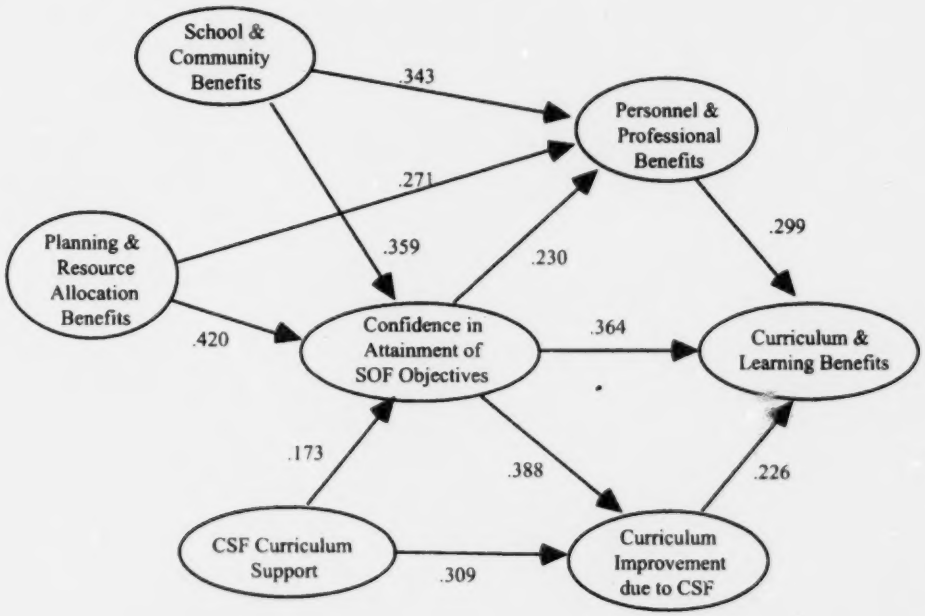
Primary Principals Association and the University of Melbourne. Its purpose is to monitor the processes and outcomes of Schools of the Future as perceived by principals. Seven state-wide surveys have been conducted. Findings from the most recent survey in 1997 are reported here (Cooperative Research Project, 1998).

Principals in the base-line study in 1993 were invited to list the benefits they expected from their schools being Schools of the Future. Twenty-five benefits were classified in four areas: curriculum and learning, planning and resource allocation, personnel and professional, and school and community. These expected benefits were included in subsequent surveys, with principals asked to rate on the 5-point scale the extent to which each had been realized in their schools. Noteworthy as far as outcomes are concerned are responses for items related to curriculum and learning: more responsive and relevant curriculum, improved learning outcomes for students, and opportunity to innovate, each of which had a mean of 3.3 on the 5-point scale in 1997. For the second of these, improved learning outcomes for students, 84 percent of principals provided a rating of 3 or more on the 5-point scale. Similar ratings were achieved in 1995 and 1996. Assuming this is a considered response, it is an important finding worthy of closer examination.

It is possible to undertake analysis of responses in the survey to determine the direct and indirect effects of selected factors on learning. The approach known as structural equation modelling was employed, using LISREL 8 (Jöreskog and Sörbom, 1993). This approach allows the analysis of ordinal-scaled variables such as those utilized in the items of this survey. The 45 items or variables related to objectives and expected benefits were reduced to 7 variables or 'constructs' by grouping in related areas. Several of these form part of an intuitive explanation of which capacities in Schools of the Future ought to impact on curriculum and learning. These include greater financial and administrative flexibility, enhanced capacity to attract staff, higher community profile, planning the provision of curriculum, advice to teachers in support of the curriculum and standards framework, and confidence in the objectives of the programme to encourage continuing improvement to enhance learning outcomes.

Structural equation modelling resulted in the model shown in *Figure 7.1*, which illustrates the direct and indirect effects among six constructs and their influence on the seventh construct, Curriculum and Learning Benefits. This seventh construct is of major interest and it includes perceptions of improved learning outcomes. The model is powerful in an explanatory sense for it has an Adjusted Goodness of Fit index of 0.969, indicating that 96.9 percent of the variances and co-variances in the data are accounted for in the model.

Figure 7.1. Explanatory model of direct and indirect effects among factors influencing principals' perceptions of Curriculum and Learning Benefits in Schools of the Future, Victoria, showing standardized path coefficients. (Cooperative Research Project, 1998)



The numbers in *Figure 7.1* are standardized path coefficients and may be explained in this way. The coefficient for the path from Personnel and Professional Benefits and Curriculum and Learning Benefits is 0.299. This means that an increase of 1 standard deviation in principals' ratings of Personnel and Professional Benefits is associated with an increase of 0.299 of a standard deviation in ratings of Curriculum and Learning Benefits. In terms of direct effects, the model indicates that principals who gave high ratings on the achievement of Personnel and Professional Benefits and who report Curriculum Improvement due to the Curriculum and Standards Framework, as well as having Confidence in the Attainment of the SOF (Schools of the Future) Objectives, tend to be those who also give high ratings to the achievement of Curriculum and Learning Benefits. Among the indirect effects, the most interesting is for Planning and Resource Allocation Benefits. The effect on Curriculum and Learning Benefits is indirect, mediated through Personnel and Professional Benefits and Confidence in the Attainment of SOF Objectives.

The explanatory model is confirmation of what research elsewhere has shown, namely, that decentralization of decision-making in planning and resource allocation does not, of and in itself, result in

improved learning for students. There is no direct cause-and-effect link between the two. What the model does suggest, however, is that if the linkages are made in an appropriate way, then an indirect effect is realized through action in the personnel and professional domain and also in the curriculum domain.

The limitations of the research are acknowledged, since it is based on perceptions of principals. However, the application of a powerful analytical tool to the large body of data has yielded a consistent pattern for ratings in the last three surveys, pointing to linkages that should be made in the self-managing school if this aspect of a reform programme is to have an effect on learning outcomes for students. Case study research confirms the pathways suggested in the model contained in *Figure 7.1* in schools where gains in learning outcomes have been achieved (see, for example, Hillier, forthcoming; Wee, forthcoming).

Evaluation of formula funding in Victoria, Australia

Perhaps the most significant point that can be made about the implementation of formula funding of schools in Victoria is that it has emerged as part of recent quite dramatic reforms. The developments in Victoria build upon almost two decades of incremental change aimed at giving schools increased levels of autonomy and accountability. For example, there is a long history of local school governance, with each school community electing a school council on which two-thirds of the members are non-education system employees. School councils have responsibility for developing and approving the school's charter, approving the school's budget, managing finances and reporting on the school's performance through the annual report. They now have significant additional responsibilities for a range of staffing decisions, including involvement in and final approval of the selection of the school principal.

This long history has not been one of smooth or easy change. Indeed, at all points along the way, change has been hotly contested and frequently resisted. Many of the changes now being implemented were identified as desirable over a decade ago, but the political will and capacity to drive through a strong change agenda have been lacking. These same changes were implemented in 1993-1994 because of the overwhelming electoral advantage enjoyed by the government. This, in turn, raises the question as to whether the changes effected thus far are irreversible and whether some future government may want to centralize control again. The general view is that having given schools real control over local decision-making and resources, it would be unlikely that any future government would see advantage in changing direction and re-centralizing unless strong evidence emerged of serious, unintended, negative consequences of the reforms.

In addition, there is also the general view that the system of school financing in Victoria, which had evolved over decades, had become excessively obscure and riddled with inequities and anomalies. The prospect of a fairer and more transparent system of funding has thus generated its own momentum for reform, even when it has been pointed out that the proposed changes may involve some pain for those schools that have faired relatively well under the old and less equitable funding arrangements. This leads to the second key observation, which is that fundamental reforms of school financing inevitably generate 'winners' and 'losers' and this places real limitations on the pace of change.

It is generally not possible to reduce significantly financial allocations to schools that in the past may have been 'over-funded' without generating an adverse political backlash. The alternative is to hold the funding levels of such schools constant until other schools have caught up, or to reduce funding to the appropriate level very gradually. This in turn implies that full implementation of new funding arrangements may take many years to effect and involve messy interim arrangements.

This suggests that while principals, along with most staff in schools, see merit in the reforms, they have found the pace of reform hard to accommodate and perceive that they have not had the degree of support that they would ideally have liked. This is despite the fact that there has been a massive programme of professional development in place to assist principals and other staff to adjust to the new arrangements. This leads to a third key observation, namely, that it is almost impossible to overestimate the amount of professional development, training and support services needed to sustain real reform.

Early on in the piece, when the reforms were first being implemented, a very large number of principals took the opportunity to accept the offer of a voluntary departure package and to retire earlier than would normally be the case. Those that remained and those that took the place of those departing have clearly found the changes challenging in the extreme. In other words, change has come at a considerable cost to those involved in implementing the new arrangements. But in view of the harsh reality of short electoral cycles and the reduced ability of governments to apply additional resources to smooth over the rough edges of change, are there any real alternatives to the 'crash through' approach to genuine reform?

A fourth key observation is that despite the pace and extent of the reforms thus far, the process in Victoria continues to be an evolutionary one, with key issues being progressively addressed. One such issue is the movement from centralized workforce planning to school-based management – which has major implications

for the re-deployment of excess staff. Schools that are not carrying teachers in excess are beginning to use their newly acquired staffing flexibility to make strategic decisions, including appointing staff on term contracts, trading in a number of highly paid teaching positions for a larger number of new teachers or teacher aides, offering a very attractive position to recruit a person with special qualities, and so on. The experiences of these schools points to the desirability of moving as quickly as possible to ensuring that all schools receive full staffing flexibility.

A related challenge concerns the method of charging for teacher salaries. For teachers in promotional positions, schools are allocated funds and charged at actual salary costs ('actuals in, actuals out'). For the 70 percent of teachers not in promotional positions, schools are funded and charged at average salary costs ('averages in, averages out'). This introduces an element of inequity into funding arrangements, since schools in more affluent and favoured locations tend to have the more experienced teachers at the top of the salary scale. Were such schools funded on the basis of average salary costs, but charged on the basis of actual expenditure on salaries ('averages in, actuals out'), they would be obliged to change the mix of their staff and employ a greater proportion of beginning teachers. In the longer term, it is preferable that all schools move to an 'averages in, actuals out' system of funding, since this is a fairer system and also one that promotes the efficient use of resources. This approach has been adopted in Britain. It is acknowledged, however, that this is something that would need to be phased in gradually, perhaps by extending the 'averages in, actuals out' method to all new appointments of teaching staff made by schools, but by retaining the 'averages in, averages out' method for all existing staff.

Other challenges to be faced in the future development of the Delegated Schools Budget include approaches to funding the introduction of new information technologies in schools. It is evident that we are now experiencing an awesome social and economic revolution as the Information Age becomes a reality and as the power of new information technologies transforms the home, the school and the workplace, breaking down many of the barriers that have thus far allowed these to exist as separate worlds. For schools, the costs of buying computers, of installing fibre-optic cabling, of creating local area networks, of linking to the worldwide web, and of providing the necessary training and support service for teaching staff, are massive. Furthermore, it is not clear which are ongoing costs and which are one-off costs, or which should be borne by the school and which by parents or the community at large. None of these costs have been properly factored into school budgets, yet there is some urgency to resolve how this should be done.

Conclusion

The final key observation relates to the extent to which the reforms to school financing, as reflected in the experience of Victoria, translate into educational benefits for students. The answer to this question has two parts. First, it is unlikely that the reforms to date will have had a significant impact on student achievement, nor would one expect such a direct effect in the short term. Rather, it is more realistic to expect that the effect of the reforms may be to build up the *capacity* of schools to better target resources to student learning needs and school priorities. Preliminary evidence cited earlier in the chapter suggests how direct and indirect links have been made between elements of the reform and learning outcomes.

The other part of the answer relates to other aspects of the school reform agenda that are being pursued through the Schools of the Future programme. These cluster around three broad areas of reform that complement the reforms to school financing, namely, reforms directed at setting high standards and clear expectations in the curriculum; a package of reforms aimed at improving the professional capacity, status and competence of teachers; and a further package of reforms designed to strengthen the accountability of schools for the way in which they use resources to improve student learning. Real improvements in educational outcomes are likely only when schools focus on change at the level of the classroom and this means that changes to school financing arrangements must be related to a total package of reforms aimed at improving the quality of teaching and learning. There are encouraging signs in schools in Victoria that this focus on classroom teaching is starting to emerge, but at this stage it would have to be said that these signs represent the very early days of the next wave of school reform.

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Chapter 8

Case study 2: Formula funding of schools in England and Wales

Rosalind Levačić

This chapter is about the system of formula funding of schools in England and Wales. Scotland has a separate education system administered under Scottish legislation and Northern Ireland has its own version of English and Welsh legislation. As will be explained below, the chapter focuses on the formula funding of schools maintained by local education authorities which are the education departments of multi-service locally elected government authorities.

The origins of formula funding

The formula funding of all state schools for the vast majority of their expenditure requirements was introduced into England and Wales by the 1988 Education Reform Act, which ushered in a period of continuing managerial and curricular change. In terms of the three major functions of a school funding formula set out in *Chapter 3*, the market regulation function was predominant from 1988 until the Conservative Government left office in 1997. The directive and equity functions have received greater emphasis under the Labour Government. The main thrust behind each government's education reforms has been the desire to make the education system produce a more highly skilled and productive workforce in order to enhance the United Kingdom's international competitiveness.

A major innovation of the 1988 Act was 'local management of schools' – the requirement that all schools have delegated to them extensive management responsibilities and the budget to support these. Local education authorities (LEAs) are required to distribute the delegated budgets of their schools by means of a formula within guidelines set by the Department for Education and Employment (DFEE). LEAs have some discretion to determine their own formula within the parameters set but must have their local management schemes approved by the DFEE. The amount of local education authority spending is jointly determined by central and local government. The latter raises about 20 percent of its spending from domestic property tax, receiving the rest as a block grant from central government, which the local authority can distribute as it pleases

amongst all its public services. From 1992 to 1996 formula funding operated in the context of central government reductions in school funding in real terms per capita. The Labour Government has continued with much of the previous government's education policies and intends to extend budget delegation (DFEE, 1998).

Prior to the 1988 Act there were three main kinds of formulae used by LEAs for resourcing schools: student/teacher ratios for establishing basic funding levels and per capita funding for books, materials and equipment (Component 1); additional allocations for special (supplementary) educational needs (Component 3). Many LEAs used student/teacher ratios for allocating teaching staff to schools, usually allocating whole number of teachers according to the number of classes the LEA expected each school to form given the numbers of students in each grade and the LEA's class-size norm for that grade. The move to funding schools on a per capita basis, where each student is funded for a fraction of a teacher, rather than allocating whole teachers to schools according to the number of classes, was quite significant. It required a change in LEA thinking to implement the new funding methodology, as well as a transitional period in which schools could adapt to per capita funding.

Earlier government encouragement of formula funding in the United Kingdom was related to the equity function. In 1967 additional funding for schools in socially deprived areas was recommended by the Plowden Report (CACE, 1967) following commissioned research establishing how socio-economic disadvantage and low educational attainment reinforce each other. Plowden recommended that objective factors be used for allocating additional resources and considered eight specific indicators of social and family background. Following Plowden, schools in designated 'educational priority areas' were funded through their LEA for additional resources, usually expenditure on staffing. LEAs were encouraged to develop their own formulae for this purpose. The most highly developed of such educational priority formulae was that of the now defunct Inner London Education Authority. In the 1980s the Inner London Education Authority (ILEA) developed indicators based on socio-economic data on a sample of students in each school. This was a well-researched funding formula, where the indicators of special educational need were selected on the basis of the degree of correlation between the indicators and students' subsequent educational attainments (ILEA, 1984; ILEA, 1987). Other authorities also developed special educational needs indicators based on census and government department data of welfare benefit recipients and family background characteristics, or on the results of standardized educational tests. In response to low educational achievement in socially disadvantaged areas, the Labour Government is introducing

educational action zones, where contracted partnerships of LEA, schools, and business are funded to experiment with new practices.

Local management of schools developed out of some LEA initiatives to delegate budgets to schools. One of the early pioneers of local management, Cambridgeshire LEA, had already begun to implement a funding formula prior to the national scheme (Howard, 1989). In the formula that LEAs were subsequently required to develop, LEAs utlized their earlier work on apportioning funds for basic needs (Component 1) and supplementary needs (Component 3).

Policy context for formula funding

As noted in *Chapter 3*, the role of a funding formula depends on the education system and policies within which it is embedded. The funding formula in England and Wales was an essential component of the Conservative Government's more market-driven education system. Its role has to be understood in relation to the other key measures in the 1988 Act and those structures from earlier legislation which remained. An important element of these educational changes was the reduction in the powers of local government and the increase in those of central government. This occurred in the context of an unwritten constitution which does not give local government any constitutional safeguards.

The regulatory framework, within which formula funding plays its part, is outlined in *Table 8.1*. Taking stakeholders first, the 1988 Act gave parents greater choice of school and LEAs were prevented from protecting unpopular schools by forcibly allocating students to them. A child must be admitted to the state school chosen by its parents, provided that the school has not yet filled all its 'standard number' of places and, in relevant cases, the child meets any selection criteria of religious affiliation or ability. Schools may be forced to admit more students than their standard number of places available if parents are successful in appealing to a special panel. Schools have a financial incentive to recruit students since currently at least 80 percent of the schools' budgets must be allocated according to the ages and numbers of students in each school. Thus formula funding is explicitly linked to parental choice of school and is an essential component of the 'quasi-market' for schools. The formula sets the terms under which the LEA purchases a school place, on behalf of parents, from the school as provider.

The creation of the schools' 'quasi-market' was accompanied by extending the domain of management decision-making at school level. As indicated in the first and second columns of *Table 8.1*, the powers and responsibilities of governing bodies (school councils) and headteachers (principals) were increased at the expense of the LEA.

Table 8.1. Constituent elements of school-based management in England post-1988

Stakeholders to whom decision-making is decentralized	Management domain for school-based decision-making	Regulation
School governing body: Responsible for managing the school. Delegates day-to-day responsibility to the headteacher. ***Parents:*** Elect parent governors; some choice of school. *Local authority:* (reduced powers) Sets overall budget within central government limits. Draws up local management scheme. Responsible for special education, admissions policies for LEA schools, and other remaining functions such as capital programme, property maintenance, central services. From 1998 must have Education Development Plans to improve schools. ***Business community:*** Involvement in local training, education action zones, and co-opted as school governors.	***Budget:*** Schools manage their own budget for almost all their needs. ***Physical resources:*** LEA schools have 'tenant' responsibilities. GM schools control all assets and apply to FAS for capital allocations. ***Staffing:*** Determined by governing body. The LEA or GM governing body is the legal employer. ***Students:*** School admits students according to its admissions policy: GM schools determine own admissions policy within legislative constraints. ***Curriculum:*** School have discretion on how to teach and organize the national curriculum. ***Performance:*** From 1998 it is expected that schools must set targets for national test and public examination results.	***Use of resources:*** Financial audit; teacher qualifications, pay and conditions nationally set with increased local flexibility; national employment laws; no limitations on class size; no minimum space rules; Health and Safety legislation. ***Product specification:*** National curriculum; national tests and other performance indicators; inspection of educational standards and quality; minimum school hours. Target setting. ***Market conditions:*** Exit and entry—new schools, school closure or change in 'standard number' must be approved by DFEE or FAS. Publication of information about school performance. Parental choice of school. More permissive regulation of admission policies, which has permitted more schools to select by ability.

Delegating budget decision-making to school level was a major innovation. Decisions taken at school level include staffing establishment and recruiting, training, disciplining and dismissing staff, although the LEA remains the employer of LEA-maintained schools' staff.

Some aspects of regulation continued or were amended, but new forms of regulatory control were introduced. Particularly radical for Britain was the creation of a national curriculum for all

students of compulsory school age (5 to 16 years) and new national tests for children aged 7, 11 and 14. This has been accompanied by the requirement for individual schools' tests and public examination results to be released and published nationally, and by the introduction of regular inspection of all schools by the Office for Standards in Education (OFSTED), with open publication of reports.

These measures were based on the explicit view that an injection of market forces, combined with increased regulation of schools' educational outputs, would stimulate schools to improve educational standards, in order to recruit students and secure finance. In the government's own words:

> *"The objective has been both to put governing bodies and head teachers under the greater pressure of accountability for better standards and to increase freedom to respond to that pressure" (DFE, 1992, para. 2.8).*

The 1988 Act was also significant in creating a new state school sector to compete with the local authority sector by enabling schools to opt out of local authority control and become grant maintained if this was approved by a majority of voters in a ballot of parents. Grant-maintained (GM) schools were financed by a special Funding Agency for Schools (FAS) using money creamed off from the LEAs from which the GM schools had opted out. By 1997 there were 1,139 (GM) schools – 17 percent of secondary and 2 percent of primary – educating 18 percent of secondary and 3 percent of primary students (CIPFA, 1997). The existence of the grant-maintained sector has considerably complicated school finance in England and Wales. This is because LEAs spend differing amounts per student, so GM schools have been funded as if they were still with the LEA, but with additional grants in lieu of LEA services. The School Standards and Framework Act (1998) creates a new category of foundation school to which most GM schools will transfer. It also creates a category of community school for LEA-maintained schools and allows for equivalence of funding of both categories of school, with both categories able to have 100 percent budget delegation (DFE, 1998).

Criteria: government objectives for formula funding

The broad objectives served by formula funding in the Conservative government's view were indivisible from those it had for local management of schools (LMS):

> *"The purpose of local management of schools is to enhance the quality of education by enabling more informed and effective*

> *use to be made of the resources available for teaching and learning. As such LMS is a key element in the Government's overall education policies" (DFE, 1994, p. 7).*

A clear statement of these overall aims was given in the White Paper *Choice and Diversity*:

> *"The overriding aim of government policy is continuously to raise the standards achieved in schools by all students of all abilities" (DFE, 1992, para. 2.1).*

More precise objectives for formula funding were published in 1988 (DES, 1988) and reiterated in 1994:

> *"The purpose of formula funding is to bring about an equitable allocation of resources between schools, based on objectively measured needs rather than historical patterns. Within each LEA, schools with the same characteristics and the same number of students should receive the same level of resources" (DFE, 1994, p. 7).*

As well as the above objectives which reflect the criteria of effectiveness, efficiency and horizontal equity between schools, accountability and transparency were also included as government objectives – an LEA's formula "should be as simple and clear as possible, so that governors, staff and the local community can readily and fully understand how it operates" (DFE, 1994, p. 7).

A significant aspect of the formula funding guidelines is disallowing any features which would permit local authority officers discretion in the allocation of resources to individual schools, as used to be the case, and replacing this with a transparent formula agreed through consultation with stakeholders, to be impartially applied.

Therefore the main criteria for assessing formula funding in England and Wales are effectiveness, efficiency, transparency, sensitivity to local needs and accountability. While there are provisions for equity in the formula, as we shall see below, equity, not surprisingly, took a back seat in educational reforms, which concentrated on increasing competition and the state's regulation of school outputs. The emphasis on competition has shifted to performance management, under the Labour Government. LEAs and schools have to set targets for national test and public examination results and are monitored against these. Equity of outcome is receiving greater prominence through the funding of national literacy and numeracy projects and the setting up of specially funded education action zones.

School budgets: centralized and delegated portions

The general thrust since 1988 was to extend the types of school for which schemes were required so that, eventually, all secondary, primary, and special schools had delegated budgets. Also, the DFEE continued to put pressure on LEAs to increase the proportion of school expenditure delegated to schools.

(a) Rules regarding retentions

The government does not specify how much LEAs should spend on schools, but it does have clear rules regarding which expenditures are to be retained centrally by the LEA and which delegated to schools. A key element of the framework is defining categories of expenditure. At the time of writing the DFEE is proposing to change the rules regarding the division of funds between LEAs and schools and their relative responsibilities. This chapter describes the system extant, since illustrative statistical data are expressed in terms of constructs belonging to the current system.

From 1988 to 1998 the *General Schools Budget* (GSB) was the starting point for the division of moneys between LEAs and schools. The GSB is the LEA's total direct and indirect expenditure on schools. The GSB differs from the Total Schools Budget defined in *Chapter 3* because it includes capital expenditure. The total delegated budget to all schools in the LEA is called the *Aggregated Schools Budget,* or ASB. The ASB is the GSB minus the expenditure items which the LEA retains centrally. There are two types of expenditure which the LEA retains centrally. The first consists of those items which the LEAs must retain: these are called the *mandatory exceptions* (equivalent to essential retentions in *Chapter 3*). The items included in mandatory exceptions are:

- capital expenditure;
- central government and EC grants;
- premature retirement and dismissal costs; and
- educational psychology and welfare services.

There is a further list of *discretionary exceptions* (equivalent to optional retentions in *Chapter 3*). These are expenditure items which the LEA may choose to delegate to schools. LEAs must delegate to schools at least 85 percent of a total called the *Potential Schools Budget* (PSB). The Potential Schools Budget is the General Schools Budget minus the mandatory exceptions and those discretionary exceptions which are not included within the PSB. Hence there are two types of discretionary exceptions – those included and those not included in the PSB.

Discretionary exceptions not included within the PSB are:

- school meals;
- home-to-school transport;
- student support (for example, clothing grants);
- governors' insurance;
- LEA initiatives (restricted to .05% GSB); and
- contingencies (for unanticipated costs incurred by individual schools).

Discretionary exceptions included within the PSB are:

- structural repairs and maintenance;
- premises and equipment insurance;
- special staff costs (for example, absences for jury duty and union representatives, long-term sick leave);
- LEA support-teams for students with special needs; and
- support for schools 'requiring special measures' after an inspection report.

The Aggregated Schools Budget (ASB) is the amount left to delegate to schools when the mandatory and both types of discretionary exceptions have been subtracted from the General Schools Budget. The relationship between these different budget categories is shown in *Figure 8.1.*

Figure 8.1. Relationship between General Schools Budget (GSB), Potential Schools Budget (PSB) and Aggregated Schools Budget

General Schools Budget (GSB)

subtract:

Mandatory exceptions

subtract:

Discretionary exceptions not included in the PSB

equals:

Potential Schools Budget (PSB)

subtract:

Discretionary exceptions within PSB retained by LEA

equals:

Aggregated Schools Budget (ASB)

The way these constituent parts of the General Schools Budget are allocated in relation to the four main funding components, defined in *Chapter 3*, is shown in *Table 8.2*. The grid in *Table 8.2* shows how the three categories of central retentions and the aggregated schools budget are allocated in relation to the four funding components. *Table 8.2* brings out quite clearly the way central retentions are mainly for Component 4 (school-specific factors) with some allocations for Component 3, but that basic needs are funded out of the delegated schools budget, which is considered in more detail below. This pattern of allocation illustrates the application of the criteria of effectiveness and efficiency as expressed in the subsidiarity principle. Expenditures which vary considerably in incidence across schools and cannot be predicted from data on measurable objective factors are not suited to delegation to schools by formula.

Table 8.2. The relationship between the funding Components (see *Chapter 3*) and the constituent parts of the General Schools Budget (GSB)

Parts of the GSB	Component 1: Basic student allocation	Component 2: Curriculum enhancement	Component 3: Student supplementary educational needs	Component 4: School site needs
Mandatory exceptions.			Educational psychology and welfare services.	EC and central government grants. Early retirement and dismissal. Capital expenditure.
Discretionary exceptions.	Governors' insurance. Premises and equipment insurance.	LEA initiatives.	Student grants. LEA support teams.	School meals. Transport. Contingencies. Structural repairs. Special staff costs. Special measures for failing schools.
Aggregated Schools Budget.	Student-led element.		Up to 20% of the ASB can be allocated for these components.	

The distribution of the general, total, and potential schools budget between English LEAs' centrally retained spending and the

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aggregated schools budget is shown in *Table 8.3*. In order to facilitate comparisons with the other country case studies, capital expenditure has been subtracted from the GSB. The resulting concept is referred to as the Total Schools Budget (TSB) in order to create an internationally comparable statistic. However, the term 'Total Schools Budget' is not used in England and Wales in the sense that it is in this chapter. Taking all three school sectors together for all English LEAs, 22 percent of the TSB is centrally retained and 78 percent is delegated to schools. Of this, 62 percent is allocated for Component 1 (basic needs), leaving 16 percent for Components 3 and 4. *Table 8.3* also shows these amounts and percentages for the three school sectors separately.

Table 8.3. General, Total, Potential and Aggregate Schools Budgets 1997/98 (totals for English and Welsh LEAs)

	Primary		Secondary		Special		All sectors	
	£M	% TSB	£M	% TSB	£M	% TSB	£M	% TSB
General Schools Budget	9,303	104	7,392	105	1,200	105	17,895	100
Minus								
Capital expenditure	380		379		56		815	
Total Schools Budget	**8,923**	**100**	**7,013**	100	**1,144**	100	**17,080**	100
Minus								
Mandatory exceptions	967	11	789	11	125	11	1,881	11
'Excluded' discretionary Exceptions	648	7	457	7	234	19	1,339	8
Equals								
Potential Schools Budget	7,688	86	6,146	88	842	74	14,675	86
Minus								
'Included' discretionary exceptions	814	9	471	7	81	7	1,366	8
Equals								
Total Aggregated Schools Budget	6,874	77	5,674	81	760	66	13,309	78
Components of ASB								
Age-weighted student unit component	5,659	63	4,916	70	41	4	10,616	62
Additions	1,215	14	758		122	11	2,096	12
Place element (Special schools only)					597	52	597	3

Source: Adapted from Table 6, and Appendix E, CIPFA (1997) : Education Statistics Estimates 1997/98.

In 1998 the Labour Government consulted over proposals to increase the amount LEAs are required to delegate to schools (DFEE,

1998). It expressed dissatisfaction that some LEAs were retaining too much, using the money inefficiently and obscuring this in their accounts. The government therefore proposed to replace GSB with a new definition called the Local Schools Budget (LSB), which is the total of all LEA revenue expenditure minus expenditure on non-school education services and ongoing school-related commitments. From the LSB, LEAs would be permitted to retain money for approved functions. All the rest of the LSB would be known as the Individual Schools Budget, which would be the equivalent of the ASB. LEAs would be required to delegate 100 percent of the Individual Schools Budget. The new definitions are set out in *Figure 8.2.*

Figure 8.2. Relationship between Local Schools Budget and Individual Schools Budget

Total LEA revenue budget
subtract:
Non-school expenditure
subtract:
Ongoing school-related commitments:
Debt-servicing;
early-retirement and redundancy costs (before April 1999);
recruitment and retention schemes.
equals:
Local Schools Budget (LSB)
Subtract LEA expenditure on:
Strategic Management
Access (infrastructure, admissions, attendance)
Support for school improvement
Special education
Special cases *(music service, school insurance)*
equals:
Individual School Budgets
100 percent delegated to schools, which can ask LEA not to delegate expenditures it retained before April 1999.

(b) Delegated expenditures

Up to April 1999, LEAs were required to delegate at least 85 percent of the PSB as the ASB, but in fact most delegated between 85 to 95 percent. The expenditure items which must be delegated for school-level decision-making include, most importantly, staff – which typically accounts for around 80 percent of schools' total spending. Other items which schools decide for themselves are supplies and services including utilities, and ground, buildings, and equipment

maintenance. Grant-maintained schools had 100 percent delegation, including money for minor capital works. In order to bring ex-GM schools and LEA schools under a common funding framework, the government is proposing that LEAs delegate 100 percent of the Local Schools Budget. Schools which do not want to take on additional responsibilities would be able to ask the LEA to retain what was not delegated before April 1999.

The delegation of all current staff expenditures is a particularly significant feature of the English and Welsh school-based management. It is up to the school's governing body to determine the staffing establishment, including numbers of specific teaching and non-teaching posts. While the pay scales of teachers and ancillary staff are set nationally, governing bodies have some discretion on awarding additional scale points to teachers and senior staff and in determining the job descriptions of ancillary (support) staff. A particularly contentious feature of the English and Welsh schemes is that schools are funded according to the average cost of the LEA's teachers (differentiated by sector) but have to pay the actual salaries of the teachers employed. This rule is consistent with the function of the formula in regulating the schools' quasi-market. The official justification for this 'average-in-actual-out principle' was that:

> *"it secures a key aspect of delegation by making local managers directly responsible for the costs of their services and giving schools an incentive to manage the total resources under their control effectively" (DFE, 1994, p. 36).*

The only exception is that the LEA has discretion in relation to schools with not more than 12 teachers or 330 students, to fund the difference between actual salaries of the schools' teachers and the average LEA salary. Under Labour this rule is being reviewed with a view to adopting the average-in-average-out salary rule instead.

Financial regulations with respect to school budgets

The LEA is required to allocate a 'budget share' to each school calculated according to the funding formula, the parameters of which must be published before the budget shares are announced prior to the start of the financial year. In practice, while schools are usually given a provisional budget two or three months before the start of the financial year, the actual budget share is announced only a few weeks before the beginning of the financial year in April. However, schools are still uncertain of their financial position because they are not informed of their carry-forward amount until two or three months into the next financial year. As the financial and academic years do not coincide, there is an issue as to when the count of

students which are funded by formula is taken. The DFEE undertakes a national census every January, whereas students are newly recruited for September. For funding purposes LMS schemes measure school enrolments by using various combinations of school census figures for the previous and next January or LEA school estimates for the coming September. There are delays in adjusting school budgets to reflect differences between the number of students a school actually enrols in September, and the number of students funded for the previous April. These discrepancies add a further source of financial uncertainty.

The circulars specify that the LEA cannot alter a school's budget in the current financial year, other than in exceptional cases of contingency funding. However, it has been established through the courts that if an LEA has issued school budgets assuming it would be able to raise more finance than the government allows it to, the LEA can then claw back school budgets in line with its reduced overall budget. LEAs can, if they wish, provide for a degree of stability for schools by limiting the year-on-year change in any school's budget share to 5 percent or less. An important feature of LMS schemes is that schools must be able to carry forward surpluses or deficits into the next financial year, in contrast to the previous regulations when anything not spent in the financial year was taken back, encouraging inefficient spending by schools to prevent this. Schools are not allowed to plan for a deficit, unless it is agreed as a capital investment project to be paid out of next year's budget. Only a very small proportion of schools has fallen into actual deficits. Schools in deficit have been quietly assisted out of this position by the LEA or, in a few cases, selected for closure. At the other extreme, it has been more usual for schools to accumulate unspent reserves, either to ensure financial security or to save up for a capital project. As a proportion of schools has underspendings in excess of the accepted 5 percent of their budgets, there is some concern that these schools are not managing their budgets effectively.

A further efficiency incentive under local management is that schools can keep all income earned – mainly from renting premises, or from sponsorship. This is in addition to funds raised by parent/teacher associations, which are accounted for separately. School-generated income is typically about 1-3 percent of the budget. Schools vary in their judgements as to the value of devoting time to income earning and sponsorship. The latter has been encouraged by government schemes to give matching funding to specialist secondary schools which obtain significant sponsorship from the business sector. A few schools have been outstandingly successful at raising resources through sponsorship.

Certain contractual arrangements are required of schools. In particular, schools are subject to the same compulsory competitive

tendering legislation as local authorities for a range of services (for example, building, maintenance, catering, sports and leisure management). Schools employing less than three full-time-equivalent staff on cleaning and grounds maintenance are exempt.

Budget delegation does not necessarily imply that schools have actual cash allocated to them. At the start of local management most of the school budget was held in an account by the LEA: the school told the LEA how it wanted it spent. As LEA accounting was often slow and inaccurate, this led initially to considerable frustration and, in response, school cheque accounts were more extensively used. While this requires more clerical work in schools, cheque accounts earn schools interest and prompt payment discounts, as well as ensuring more timely and accurate financial records. The DFEE (1998) proposes that all schools should have the right to a bank account for their delegated budgets.

The design of the funding formula

The Aggregated Schools Budget has to be allocated to schools by a formula which determines each school's *Budget Share*. The funding formula is a major part of each LEA's local management of schools scheme. Following the analytical framework set out in *Chapter 3*, the English and Welsh LEA funding formula consists of three of the four Components: (1) basic allocation, (3) student-specific factors (4) school-specific factors. The student-driven nature of the funding formula was a significant aspect of Conservative Government policy:

> *"In order to ensure that the central determinant of need is met and that schools have a clear incentive to recruit and retain students, the total of resources allocated on the basis of the number of students must account for at least 80 percent of the LEA's ASB, less the total budget shares for special schools" (DFE, 1994, p. 31).*

Within the 80 percent of the ASB which must be student-led, up to 5 percent may be used for other student measures than head count and age, in particular, indicators of special educational need. The DFEE guidelines also advise LEAs to include Components 3 and 4 in their schemes: these may account for no more than 20 percent of the ASB. The DFEE also restricts the types of indicators to those which can be objectively measured so that budget allocations do not depend on LEA officer discretion. Under the proposals to extend delegation to 100 percent of the Individual Schools Budget, it seems most likely that the 80 percent requirement will be reduced and/or modified.

Table 8.4 presents a summary of the characteristics of the English funding formula specified in DFEE guidelines by showing the

Table 8.4. Relationships among components, dimensions, and indicators in the development of a school funding formula in the United Kingdom

Components	Dimensions	Indicators
Component 1: Basic student allocation		
1(a) Basic allocation	1(a) Total enrolment	1(a) Weighted total enrolment
1(b) Grade-level supplement	1(b) Grade-level differentiation	1(b) Weighted enrolment in each grade level
Component 2: Curriculum enhancement		
	2(a) Specialist curriculum	2(a) Weighted total enrolment in technology school
Component 3: Student supplementary educational needs		
	3(a) Socio-economic disadvantage	3(a) Number of students with low scores on composite indicator that includes entitlement to free luch, family on welfare benefits, and various socio-economic information drawn from the Census
	3(b) Non-fluency in language	3(b) Number of students not fluent in English
	3(c) Low educational achievement	3(c) Professional audit of students below cut-off on standardized tests
	3(d) Disabilities, impairments, etc.	3(d) Professional audit of students with official 'statement' of special needs
Component 4: School site needs		
	4(a) School size	4(a) Supplement to small schools with size designation set by LEAs
	4(b) Site running costs (buildings)	4(b) Interior area of school buildings
	4(c) Site running costs (services)	4(c) Fixed amounts according to nature of building
	4(d) Site running costs (facilities)	4(d) Fixed amounts according to facilities (for example, swimming pools)

dimensions and indicators which relate to each Component. The Components are now considered in turn, noting that Component 2 (curriculum enhancement) does not appear in the ASB part of LEA formulae. The second Component is only used outside the main formula with respect to the funding of 'technology schools'. To obtain designation, a technology school has to obtain £100,000 of business sponsorship for curriculum enhancement such as technology or modern languages. The school then gets a matching grant of £100,000 plus £100 extra per student. There are also 15 Technology Colleges – schools which were set up with capital funding by a business sponsor in inner cities providing an enhanced curriculum in technology. They are directly funded by the DFEE.

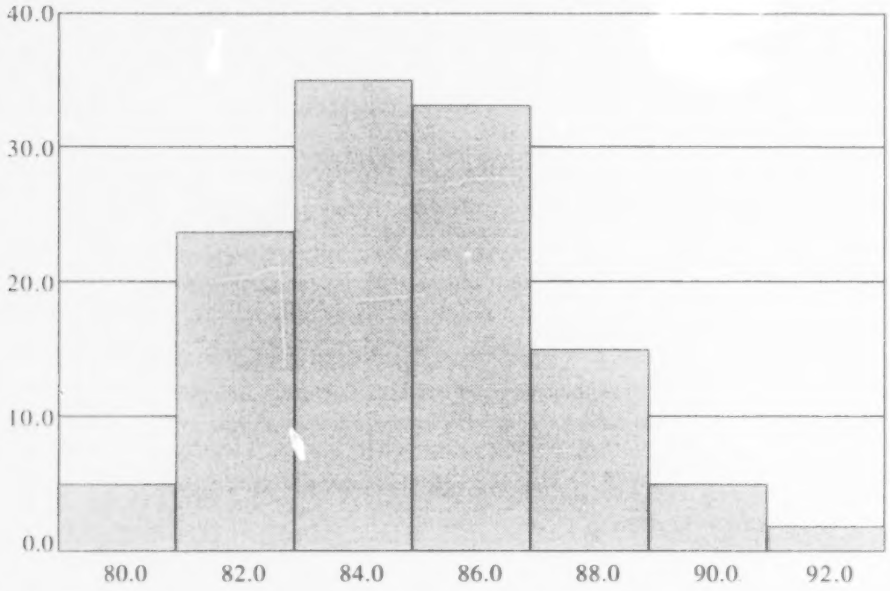
(a) Component 1: Basic student allocation

The cash amount allocated per student in a given age group is called the Age-Weighted Student Unit or AWPU. Most LEAs delegate more than 80 percent of the ASB by means of Age-Weighted Student Units – as shown in *Figure 8.3*. The proportion of the student-led component in the formula for special schools (which had to be locally managed from 1996) is not specified and LEAs are advised to include an amount per special school place. The 1993 Education Act provides for the AWPU for students who are permanently excluded from school to be withdrawn from the school, thus reducing the financial incentive for schools to exclude difficult students and compensating schools which admit them.

LEAs are free to choose both the absolute and relative cash values of the Age-Weighted Student Units. A high proportion of costs needs to be related to the number and ages of students in order to meet the 80 percent of ASB stipulation so as to leave the rest of the ASB for costs which vary with other variables which are specific to individual students or schools. The AWPU thus includes the costs of teachers for both teaching tasks and other work including school management, of support staff, and those non-staff costs which vary with the number of students. The costs are then allocated on a per-student basis. An LEA example of an AWPU allocation is shown in *Table 8.5*.

Initially there was enormous pressure on LEAs to get local management schemes up and running very quickly and without serious complaints from schools. This biased the construction of funding formulae to reflect historic practice. A particular feature of this is that primary students are less funded than secondary students, as in the example in *Table 8.5*. This is mainly because secondary students are taught in smaller classes due to subject specialism and secondar teachers get more non-contact time. How the average age-weighted student unit cash allocations for all English and Welsh LEAs vary with student age

Figure 8.3. Age-weighted student component as a percentage of the ASB (116 English LEAs 1997/1998)



Source: Education Statistics 1997/1998 Estimates, CIPFA (1997).

is shown in *Table 8.6*. LEAs can fund each of the ages between 3 to 19 differently. However, in *Table 8.6* the five key phases of schooling are shown separately.

As local management has bedded down, so LEAs have continued to review their funding formulae. There has been considerable interest in replacing formulae derived from replicating past funding patterns by the activity-led funding approach, particularly for Component 1, so as to improve the effectiveness and efficiency of the resource allocation system (see *Chapter 4*).

(b) Component 3: Student supplementary educational needs

Additional funding for special educational needs predated local management of schools. The first major development was educational priority areas, but these fell into disuse. Research showed that allocating by area rather than by individual student meant that the money was not well targeted to individual student need (Barnes and Lucas, 1975; Holtermann, 1975). Another landmark in Britain was the 1981 Education Act which introduced a formal process of identifying or 'statementing' students with special educational needs,

Table 8.5. Primary schools cash values per student (AWPUs) 1996/1997 (Hampshire)

Budget share description	National Curriculum year group: Primary							
	Nursery	R	1	2	3	4	5	6
Staffing: teacher	207	978.25	926.65	926.65	926.65	926.65	968.15	968.15
Staffing: other	897.01	332.11	125.76	125.76	111.11	111.11	111.11	111.11
Premises excluding rates (local tax)	30.71	30.71	30.71	30.71	43.17	30.71	30.71	30.71
Supplies and services	79.35	79.35	79.35	79.35	76.71	84.58	84.13	79.42
Management partnership*	12.69	15.10	15.10	17.51	29.56	29.56	29.56	24.74
Per-student value totals	1231.92	1440.68	1182.73	1185.14	1192.36	1202.31	1243.36	1233.83

	National Curriculum year group: Secondary							
	7	8	9	10	11	12	13	14
Staffing: teacher	1285.05	1285.05	1434.00	1599.22	1599.22	2108.08	2108.08	108.08
Staffing: other	129.61	129.61	129.61	129.61	189.36	184.26	184.26	184.26
Premises	70.76	70.76	70.76	70.76	70.76	70.76	70.76	70.76
Supplies and services	109.37	109.37	109.37	121.62	242.97	176.31	176.31	176.31
Per student value totals	1594.8	1594.8	1743.1	1921.2	2102.3	2539.4	2539.4	2539.4

* Management partnership includes inspection and advisory support, music services, personnel services, cleaning management, education training agency, support staff training (and financial services and IT services which are allocated as a flat rate irrespective of student numbers).

Source: Local Management of Schools: Guidance notes for primary schools 1996-1997, Hampshire County Council.

Table 8.6. Average age-weighted cash allocation per student: English and Welsh LEAs 1997/1998

National Curriculum Key Stage	Age	Average funding	Ratios
One	4 - 6	1,246	1.00
Two	7 - 11	1,166	0.94
Three	11 - 14	1,672	1.34
Four	14 - 16	2,010	1.61
Five	16 - 18	2,419	1.94

Source: CIPFA (1997) Education Estimates 1997/98, Table 9.

who then had to be given additional resources. Prior to local management of schools the resources for statemented students were allocated to schools as staff and physical resources. Subsequently, the government extended local management of schools to include statemented students and special schools which such students might attend in preference to mainstream schools. However, there is also the need for additional resources for students who have learning difficulties which are not sufficiently severe to justify a statement. Since the Warnock Report (1978) on special educational needs, it has been generally accepted that about 18 percent of students have special educational needs. Students with special educational needs but without statements are often referred to as non-statemented special educational needs (NSSEN) students.

The formula guidelines specify that formulae should contain: variations in the additional costs of making provision for students with special educational needs (including students with SEN but without statements).

> *"The Secretary of State expects any weightings for non-statemented SEN students to be both reliable and valid measures of educational need. It is open to LEAs to make use of proxy indicators where this is judged appropriate by LEAs and their schools. However, the Secretary of State hopes that LEAs will consider, as an alternative to proxy indicators, moderated SEN audit schemes such as those which are now in use in some areas. ... It is essential that such audit schemes maintain an objective basis for the funding of schools: a process of moderation is therefore vital" (DFE, 1994, pp. 31-32).*

LEAs are able to fund special needs within two elements of the funding formula:

- up to 5 percent of the ASB may be allocated for special needs within the Age-Weighted Student Unit dimension; and
- in addition to this, special needs can be funded within the 20 percent of ASB that need not be allocated in relation to student numbers (referred to as 'additional elements').

Whichever part of the formula funds special needs, LEAs are required to use indicators of the incidence of special needs in each school. In the United Kingdom the most easily available and most commonly used proxy indicator for NSSEN is student entitlement to free school meals, which applies to children from families who are in receipt of income-support payments from the Department of Social Security. The validity of this indicator depends on the strength of the relationship between educational outcomes and family

poverty. This indicator is not a strong indicator of individual students' special needs, but it is a reasonably good predictor of SEN incidence at school level. For example, Marsh (1995) found in one large LEA with 100 schools that when individual students' GCSE examination result scores were correlated with whether or not the student was entitled to free school meals, the correlation was only – 0.2. But if the percentage of students at the school was correlated with schools' average GCSE scores, the correlation was around - 0.7. The size of the school-level correlation between free school meals and GCSE results was corroborated by Levačić and Hardman (1998) in a study of 330 schools. Less commonly used social disadvantage indicators are Social Economic Status (SES) census indicators of the locality where a school's students live. This is obtained by mapping the postcodes of students' addresses to the enumeration districts used by the Registrar General's census.

An alternative, or an addition, to SES indicators which predict the incidence of special educational needs is indicators which aim to identify NSSEN. LEAs use two basic approaches to obtaining identification indicators – standardized tests and professional audit of individual students' special educational needs. Standardized educational tests are more reliable than professional audit, in that the measures obtained do not depend on individual professionals' judgements; however, they are not so finely attuned to identifying the nature of the individual child's needs. Standardized tests are used to assess cognitive abilities, for example, verbal and non-verbal reasoning and quantitative reasoning and also to assess educational attainments in reading, spelling and numeracy. Some LEAs already had such tests in place prior to LMS in order to assist in transferring students from primary to secondary schools. Others began to administer tests in order to provide a NSSEN indicator for their funding formula. In particular, base-line assessment of children on entry to school at five years old has been introduced by many LEAs, and became mandatory in 1998. Although assessments of very young children are less valid than those for older children, they have the advantage for funding purposes of avoiding moral hazard, since schools are not provided with a financial incentive to depress test results by poor teaching. However, schools may be tempted to depress base-line scores in order to produce better value-added measurements of student progress.

The way in which test results are used to derive an indicator for a formula varies. Some LEAs use a single test, others a weighted average of two or more tests. There are also variations in how the test scores are used to allocate money. In some formulae a cash amount is allocated according to the value of the school's index, which is the aggregate of its students' test results. In this event all schools will

receive some allocation, which will depend on the extent of each student's underachievement and on the number of such students. Alternatively, the indicator may specify a cut-off: only students marked below a certain score will count as requiring NSSEN funding, and students will receive an equal amount of funding regardless of how far below the cut-off point is their score. The detailed specification of the NSSEN part of the formula varies considerably across LEAs: most LEAs use more than one indicator, so that both SES indicators and educational tests are included with varying weights. These formulae have been derived and modified in most cases after considerable local consultation involving working parties of headteachers and officers. The NSSEN formulae arrived at reflect past practice in the authority, modified by the local response to the current policy climate.

The third type of special needs indicator is derived from a professional audit in which the child is assessed individually. Professional audit received a boost when the Special Needs Code of Practice was issued (DFE 1994). The Code established a framework of five stages of special needs assessment, starting with level 1 which is action at school level only, proceeding to levels 4 and 5 with the issue of a statement. Thus professional audit for the purposes of formula funding mainstream schools identifies NSSEN students at levels 1 to 3. The Code of Practice requires each SEN student to have an educational plan which is monitored, and resources used identified. Thus professional audit is better than standardized tests – and considerably superior to SES indicators – in providing a framework and data for accountability.

Professional audit is favoured by teachers because they have more confidence in its precision in identifying the nature of the individual need than the other two indicators. However, as professional audit reflects individual professionals' judgements, it has to include moderation in order to be a reliable measure of special need. This requirement, in addition to the one-to-one assessment process, makes professional audit the most expensive of the three methods to administer. Another disadvantage is that individually administered special needs assessment procedures which trigger additional funding encourage schools and parents to put forward children for special needs identification. As more children are identified as having special needs, so a higher proportion of an often fixed education budget is channelled towards special needs. The resulting reduction in resourcing levels for other children adds to further competitive pressures to secure more resources for children with some form of learning difficulty. The percentage of students with statements in England has been steadily rising from 1.6 in 1985 to 3.4 by 1994 (Audit Commission, 1997a).

190

Most LEAs use more than one indicator of special educational need in their formula and there has been a tendency to increase the number of indicators used. *Table 8.7* shows the popularity of different kinds of special need indicator and *Table 8.8* the numbers of indicators used.

Table 8.7. Indicators used by English LEAs for funding special educational needs

Indicator	No. of LEAs	% LEAs (1996 survey)	% LEAs (Lee, 1992)
Free school meals	77	91	81
Educational tests	26	31	28
Student turnover	25	29	18
Ethnicity/lack of fluency in English	20	24	29
Professional audit/Code of Practice	17	20	7
Other	12	14	0
Education welfare benefits	7	8	14
Student numbers	5	6	0

Source: Marsh, A. (1997).

Table 8.8. The number of indicators used by English LEAs for funding special educational needs

No. of indicators	No. of LEAs	% LEAs (1996 survey)	% LEAs (Lee, 1992)
0	1	1	3
1	27	32	42
2	26	30	28
3	15	18	18
4	11	13	7
5	4	5	1
6	1	1	1

Source: Marsh, A. (1997).

Statemented SEN students have additional resources attached to them and may be educated in special or in mainstream schools. Special schools and statemented students have now come within the remit of local management of schools, whereas in the first four years they were not included. The DFEE guidelines encourage LEAs to delegate funds for statemented students via formula but, recognizing the difficulties of accurately predicting costs, do not require it.

Special schools are now included within the LEA's LMS scheme but are exempted from the requirement that 80 percent of ASB is funded according to AWPUs. Following the recommendations of the Touche Ross report (1990), formulae for special schools can be made up of a place element and a per-student element.

Overall, there is considerable variation in local authority practice with respect to the funding of special educational needs. Authorities differ considerably in the percentage of the ASB which they distribute according to special needs. It is not necessarily the authorities with the highest incidence of SEN which allocate the highest proportion of ASB to it. Nor is this necessary since, if the incidence of SEN were the same across all schools, differential funding of schools would not be needed. However, a specific element in the formula for NSSEN increases its visibility and in so doing raises the issue of accountability more prominently.

(c) Component 4: School site needs

The DFEE guidelines specifically indicate that formulae should include "the additional costs in small schools of maintaining a curriculum comparable to that available in larger schools where the LEA considers that appropriate" (DFE, 1994, p. 31). In addition, there is the small schools teacher salary adjustment to compensate small schools for part of the difference between their teachers' salaries and the average for the LEA.

LEA formulae allocate additional finance to small schools (other than for teacher salary cost differentials) in two main ways. One is in using tapering supplements dependent on the difference between a threshold number of students and the actual number. The second is through lump sums either to all schools or to schools below a specified size. Generally schemes use a variety of small school protection items broken down into considerable detail. Thomas and Bullock (1992) in an early study of 81 LMS schemes found only 11 which relied just on lump sums; 30 LEAs used sliding scales and 40 a combination of a lump sum and a sliding scale. This study also noted a wide range in LEAs' definition of smallness. It varied from below 150 to 250 students for primary schools and from below 470 to 830 students for secondary schools. On average, in 1997/1998 LEAs allocated 2.5 percent of ASB for a small schools allowance (see *Table 8.10*), but this percentage ranged from 0 to 12 percent, as shown in *Table 8.9*. Generally, the evidence indicates that smaller schools were financially disadvantaged by the introduction of local management schemes (Thomas and Bullock, 1992; Levačić, 1993).

Table 8.9. Percentage of ASB allocated with respect to school size

% ASB allocated with respect to school size	% LEAs
Zero	13
0.1 to 0.4	20
0.5 to 0.9	13
1 to 1.9	14
2 to 4.9	19
5 to 9.9	19
10 to 12	1

Source: Education Statistics 1995/96 Estimates, CIPFA, 1995.

Apart from size, there is a range of school site factors which LEA formulae take into account and these can be very detailed. LEA allocations for premises in 1997/1998 were on average 7 percent of ASB (see *Table 8.10*) and ranged from 1 to 15 percent. In most formulae premises costs are related to area of the school as well as to the number of students. Schools may also get additional allocations for swimming pools, split sites and other site-specific factors. Thus Component 4, although delivering only 14 percent of the aggregated schools budget, has added considerable complexity to the formulae as LEAs have sought to be sensitive to local differences at school level.

Table 8.10. The three main elements of the funding formula as percentages of ASB (LEA averages for England and Wales 1997/1998)

Component	ASB %
Component 1	
Age-weighted student component	79.8
Age-weighted component excluding other student-led factors (5 percent limit)	76.1
Component 3	
Special needs in mainstream schools	4.1
Special schools place element	4.5
Component 4	
Small schools related	2.5
Premises related	7.0
Transitional and other	4.6

Source: Education Statistics Estimates, 1997/98, CIPFA.

Transitional adjustments to funding formulae

The English example shows that the move from the past practice of administrative allocation of resources to funding schools by formula creates winning and losing schools. Winners and losers in terms of budgets can be defined relatively or absolutely. In the relative definition one compares the allocation of the LEA's ASB for a single year under historic and formula methods. What each school would receive if their budgets were allocated according to the historic administrative method is compared to the budget that was allocated by the new funding formula before any transitional adjustments are made (see Levačić, 1993). In the absolute definition of loss or gain, the real value of each school's budget the year before formula funding was introduced is compared to its real budget in the next year under formula funding. This absolute definition does not distinguish between budget changes due to the formula and those due to changes in the real level of the LEA's aggregated schools budget or to changes in the school's indicators from one year to the next, whereas the relative definition of budget change due to formula funding does.

Since schools which lose budget need time to adjust, equity considerations imply that such schools need to be supported with an additional allocation while these adjustments are made. The initial guidelines (DES, 1988) allowed LEAs to build transitional arrangements into their formulae for up to four years and then subsequently to protect schools in an absolutely losing situation from having budget cuts in excess of up to 5 percent a year. This meant that in the transitional years LEAs calculated two sets of budgets, those that would apply if the pure formula was in operation, and the transitional budgets which were actually allocated after making modifications to the formula in order to protect losing schools. In effect, money was taken from schools which gained by the introduction of formula funding and redistributed to those that lost out. Transitional arrangements also added to the complexity of school funding formulae.

An overview of the components

The relative importance of the three components used in LEA formulae is indicated in *Table 8.10*. The discretion which LEAs have to use up to 25 percent of ASB for special needs (5 percent within AWPU) and school site cost differentials has given rise to considerable differences in the percentages of ASB allocated to these various categories, indicating that LEA formulae respond to differences in local conditions.

A brief evaluation of the English formulae against the assessment criteria

Evaluating the impact of formula funding is a complex task made more difficult by the limited amount of research formula funding in England (for example, The LMS Initiative, 1992 (internal to LEAs); Bullock and Thomas, 1994; Levačić, 1993 and 1998b; Thomas, 1991; 1992). Most work is internal to LEAs or commissioned by them from consultants. It must also be borne in mind that formula funding is only one of a number of major government-inspired changes to affect schools since 1988. In view of these considerations, this part of the chapter aims to provide a brief evaluation of English LEA formulae using the seven criteria introduced in *Chapter 1* in order to illustrate their application.

The division between central retentions and the delegated schools budgets

The DFEE's insistence on the delegation of a high proportion of the Potential Schools Budget was entirely consistent with the main function of the English funding formula – that of market regulation. A particular issue with respect to English LEAs is whether they have been forced to delegate too much. *Table 8.2* indicates how LEAs have retained only those expenditures for which the subsidiarity principle is weak. The effectiveness and efficiency criteria indicate that such unevenly spread and unpredictable expenditures are better retained centrally. In the climate of financial stringency operating in LEAs from 1992-1997 (stemming from restrictions on central government grants, which finance 80 percent of local spending), LEAs have cut back more on their central spending than on school budget shares. LEAs have also been forced to delegate money for previously centrally provided services such as the advisory service, music tuition, library and museum services, in-service training courses and teacher centres.

There is considerable debate over the extent to which such services are best provided by LEAs and funded through discretionary exceptions, or whether the money is best delegated to schools who are then free to determine how much to spend on these services and from whom to purchase them. One view is that LEA centrally provided services were of an indifferent quality since teachers in schools had no power to determine their content and the providers no financial incentive to satisfy their clientele. The opposing view is that once money is delegated to schools, especially in a climate of financial constraint, then schools no longer buy back sufficient of the LEA's central service for it to remain cost-effective. Small schools have a

particular problem in that the total they are allocated by formula for such services is often too little for purchasing anything worth while. In contrast, larger schools have tended to welcome the ability to choose their own service providers. There has been considerable concern at the reduction in musical instrument teaching in many LEAs, as schools have diverted the delegated funds to other uses. In response, the DFEE (1998) proposed that LEAs could retain money for music tuition.

The impact on LEA central services has not been uniform. In some areas they have collapsed more than in others, with LEA employees becoming self-employed consultants and trainers. In other areas, LEAs have retained the loyalty of schools, refashioned their central services in consultation with schools, delegated the funds and entered into service agreements with schools to buy back packages of different services. In such LEAs it is generally felt that central services are now more efficient and more effectively attuned to schools' needs than previously.

It is interesting to note that the DFEE continues with a policy of annual categorical LEA grants of around 1 percent of all state spending on schools. LEAs obtain these grants by bidding and putting up matching funds for DFEE-specified areas such as teacher appraisal, school effectiveness and staff development. This policy clearly indicates that the DFEE is not prepared to leave purchasing decisions entirely to schools (as in the case of music), but intervenes to impose its own effectiveness criteria.

In general there have been considerable improvements in the efficiency with which these resources are deployed by schools making their own decisions (Levačić, 1995), but there is also concern at the equity implications of the demise of free extra-curricular provision.

The schools' budget share

(a) Efficiency

There are two aspects of the efficiency incentives of the funding formula to consider: the system-wide impact of the way the formula changed the distribution of resources between schools, and the impact on changing patterns of resource allocation within schools.

With respect to the first aspect, what evidence is available indicates that funding formulae have provided incentives towards a more cost-effective restructuring of the infrastructure by favouring lower unit cost schools at the expense of higher unit cost schools. This finding was reported by Levačić (1993) in a detailed analysis of one LEA's formula, and by Thomas and Bullock (1992) for a large sample of LEAs. However, as pointed out by the Audit Commission (1997b),

the system-wide incentives conveyed by government policy, in particular the creation of a rival GM sector, impeded LEAs in improving infrastructure efficiency for fear that schools would opt out of LEA control if faced with reorganization or closure.

With respect to the second aspect above, the flexibility brought in by the new financial regulations, together with the allocation of lump-sums rather than earmarked budgets to schools, have resulted in greater efficiency in the way resources are used within schools (Audit Commission, 1993a; Bullock and Thomas, 1994; Levačić, 1995). Schools have been responding both to the introduction of local management and formula funding and, since 1992, to widespread reductions in real per-student funding. The main types of cost-efficiency responses by schools have been:

- pruning of school building running expenses in order to spend a higher proportion of their budgets on directly resourcing teaching and learning (Levačić, 1995);
- particularly in primary schools, employing more classroom assistants and increasing the student/teacher ratio (Dean, 1997);
- employing more staff on temporary contracts (Maychell, 1994);
- reducing the number of deputy heads (Merrick, 1994); and
- employing more ancillary support staff so that teachers can concentrate on professional tasks (Mortimore et al., 1992).

Schools have also responded to the average-in-actual-out salary principle by employing younger and cheaper teachers and retiring older teachers prematurely on enhanced pensions. This cuts school costs because the pension costs have been met from the national pension fund, but it is unlikely to be socially efficient for the system as a whole. Central government in 1997 announced that in future enhanced pension costs would have to be met by school budgets (Passmore, 1996), causing an upsurge in early retirements while these were still available.

There is also some evidence for an increase in adverse selection, which may well be socially inefficient as an increasing number of students are being excluded (that is, expelled) from school (Doe, 1996; Parsons, 1996a, b). To what extent this is because of a greater number of disruptive students, or because of their impact on a school's reputation – and hence ability to recruit students and secure finance – is not known.

(b) Effectiveness

In judging the effectiveness of a funding formula one needs to assess what incentives it provides for improvements in the quality of teaching and learning. As already argued in *Chapters 3* and *4*, in

order to promote educational effectiveness the funding formula must be needs based. If the basis for the allocation of school budgets bears little relationship to the actual resourcing needs of schools, then it is more difficult for school managers to resource education effectively.

As already indicated, a major feature of LEAs' funding formulae is that they were largely devised in order to reflect historic funding patterns and so minimize transition costs for schools. At the same time as local management of schools was instituted, the government introduced a new national curriculum. It has not publicly costed the resources required for schools to implement the national curriculum. Consequently there is an absence of an activity-led basis for funding formulae unless LEAs implement this themselves (see Case Study 2 on Cambridgeshire LEA in *Chapter 4*).

A key feature of the replication in LEA formulae of historic funding patterns is the lower funding of primary compared to secondary students. It is arguable that the relative underfunding of primary students is not educationally effective because of the evident number of low-achieving students entering secondary schools two to three years behind in basic skills and demotivated by early experience of educational failure. There has been considerable debate on the justifications for this discrepancy and pressure to increase primary sector AWPUs (House of Commons, 1994). An increasing number of LEAs have undertaken internal research into activity-led funding (for example, West, 1994). Such reviews conclude that considerably more needs to be spent than LEAs can afford in order to deliver the activities teachers are supposed to be undertaking and to have appropriate physical resources. In particular, funding reviews using activity-led methodology show that the requirements of the national curriculum and related legislation mean that primary teachers need more non-contact time than LEAs can presently afford to fund.

While there has been some reduction in the differential between primary and secondary students (Hardman and Levačić, 1994), it remains considerable. It has proved difficult for LEAs to reduce the primary-secondary differential. From 1992-1997 real per capita funding declined so any improvement in the primary age-weighted student unit would in most LEAs mean a redistribution away from secondary students and could prompt secondary schools to opt out. The increase in the proportion of primary-school classes with above 30 students, prompted the Labour Party to give an election pledge that no five to six-year old children would be in classes of over 30. It is, however, proving difficult to implement this pledge without either restricting parental choice or increasing education expenditure by adding classes to popular schools, while spare capacity exists in less popular schools.

The evidence for a positive impact of the implementation of formula funding on teaching and learning is particularly difficult to assess when there have been other significant changes as well, such as a national curriculum, testing, and a system of inspection. Whatever the incentives for effectiveness the formula provides, they will have no impact unless school managers relate their financial decisions to educational decisions about deploying resources to ensure effective teaching and learning. There has been considerable emphasis by OFSTED (1993), the Audit Commission (1992, 1993b), and the National Audit Office (1994) on improving this aspect of school management. There is some evidence of increased efficiency in the secondary sector, since the proportion of students obtaining higher grades in the General Certificate of Secondary Education has steadily increased, while the real value of per-student funding declined in about half the schools sampled (Levačić and Hardman, 1998).

With respect to the efficiency responses of schools noted above, there is insufficient evidence for specified input-output relationships in the form of school education production functions in the United Kingdom, to be sure that any of these measures enhance educational effectiveness (Levačić, 1998). All that can be said in their favour is that, given that the subsidiarity principle applies, then these are decisions taken by headteachers, their staff, and governors which reflect their judgements about the best use of available school resources.

There are particular concerns about the impact of the average-in-actual-out salary principle on the quality of education, if decisions on replacing older teachers by cheaper young ones are driven by the need to reduce school costs in the face of cuts in real per capita funding. It is possible that the experienced staff leaving the profession are effective teachers, or it may be that burnt out and ineffective staff have been induced to retire earlier than they would have done without the budgetary incentives brought in by formula funding, together with budget cuts. As noted earlier in the chapter, this rule seems likely to be amended.

(c) Equity

The funding formulae guidelines enable LEAs to reflect their own policies with respect to equity considerations by utilizing Components 3 and 4. It would appear that LEAs have been able to continue reflecting their local policies with respect to additional allocations for social and educational disadvantage in the funding formulae (Marsh and Levačić, 1995; Levačić, 1993). The requirement for formula funding has had beneficial effects in that LEAs have been stimulated to

undertake further work on improving their indicators of special educational need (Marsh, 1997) so that free school meals, criticized by the Local Management in Schools (LMS) Initiative (1992), have been replaced or modified by the use of other indicators.

The overall impact on equity of the funding formula, in the context of its main function up to 1997 as a market regulation instrument, is more complex and difficult to disentangle. From the beginning, local management commentators have expressed concerns about the consequences on students in schools which, in the face of competition, fail to maintain their student rolls and hence resources. One piece of evidence comes from the ICOSS study being conducted at the Open University on a longitudinal sample of 330 schools from 1989/1990 to 1995/1996. This shows that over the period there has been a slight tendency for schools with higher proportions of socio-economically disadvantaged students to have falling rolls and thus reduced budgets (Levačić and Hardman, 1998).

(d) Sensitivity

The English formula guidelines enable LEAs to be sensitive to their political, social, geographic and infrastructure differences. As a consequence of the way educational finance decisions are taken at both central and local government level, there are considerable differences between LEAs in per-student funding for equivalent ages. Given the history of LEA funding differentials and policy differences it is extremely difficult to introduce a national funding formula, even if this was considered to be desirable.

(e) Local democracy

This is preserved to a degree with respect to the determination of the LEA's version of the funding formula, although not with respect to local education authorities' overall powers. Under the Labour Government, LEAs are being fashioned into instruments of central government administration at local level. They have been set school improvement targets in terms of proportions of students achieving particular test and examination results and are required to have DFEE-approved Education Development Plans for achieving these targets. LEAs are to be subject to inspection and, if deemed to be failing, will be taken over by DFEE appointees.

(f) Transparency

As a consequence of sensitivity to local contexts, funding formulae are complex. This is particularly so in many formulae for

Component 4. School site factors tend to be many and highly differentiated. The complexity of the funding formulae means that although they are published annually – as required by legislation – and communicated to governors, very few people actually take an interest in the funding formulae or attempt to understand them. Thus the government's objective has not been fully met in this respect. Although the Labour Government's 1998 proposals envisage more transparent LEA accounting, 100 percent delegation is most likely to increase the complexity of school funding formulae for lay people. Nevertheless, much more is known about school resourcing than used to be the case when school cost data were very difficult to obtain (Hough, 1981). This improved transparency has in particular fuelled the debate about the disparity between primary and secondary funding.

(g) Low administrative costs

Given the complexity and variety of the funding formulae, administrative costs are clearly higher than they would be if a single simple national formula could be successfully implemented. It has also taken a number of years for all LEAs to develop workable and acceptable formulae. Administrative costs have also been higher because LEAs have sought to revise and improve their formulae (Yarnit, 1992). However, the formula funding system has been successfully implemented and once in place the LEA formula and its distribution mechanism can be maintained by just a handful of staff.

(h) Overall assessment

The English funding formula is relatively strong on efficiency, equity (within the formula itself), and local sensitivity. It is less strong on effectiveness and transparency. The weaknesses in the performance of the formula have more to do with systemic factors, in particular the Standard Spending Assessment methodology for allocating central government grants to local authorities and the previous government's promotion of the grant-maintained schools sector, than with the design of the formula as a technical construct.

Conclusion

In the last decade policies with respect to education finance were formulated and implemented in the United Kingdom in the context of a wider struggle for power between central and local government.

This was not a good climate for achieving a rational approach in which the financing of schools is clearly related to the costs of providing the quality of education which the national curriculum and the national school inspection framework specify. The government still does not make clear links between its specifications for the educational outputs of schools and schools' consequent resourcing needs. However, formula funding and local management of schools have won widespread acceptance and are set to continue. These trends have seen schools being gradually brought within a common funding framework that should reduce complexity and improve the equity of school financial allocations.

The previous Conservative Government evolved a policy of decentralization of resource management within a framework of centrally determined standards. This is being reinforced by the present government as it becomes more directive towards LEAs, while increasing the extent of budget delegation to schools. This is being done both to create a common funding framework for ex-GM schools and LEA schools in which the former keep their budgetary freedoms, as well as to give the appearance of additional funding being available for schools.

While the rhetoric of competition as a means of raising standards no longer finds favour with government, it is reluctant to restrict parental choice. For example, the government wants the guarantee that all five to six year-olds are taught in classes of 30 or less to be achieved without restricting parental choice, though this requires extra expenditure on new classes in popular schools. It would be more efficient if the government ensured that LEAs could fund the AWPU for five and six year-olds so that a class of 30 could be afforded, and left schools to determine their own class organization and staff deployment. As it is, the government's insistence on a particular class size is inconsistent with the principle of subsidiarity. There is a distinct tendency for government to intervene whenever decision-makers at school level, operating within government-set budget constraints, produce decisions to which other interest groups object on educational grounds. (The music service and the class-size issue are both examples of this.)

A major issue is the vertical equity disparity between primary and secondary students. This is of long standing but has come to prominence as a result of the greater transparency of formula funding and the specification of a national curriculum. The government's attempt to impose a class-size limit of 30 for five to six year-olds addresses this problem to some extent, but only at the cost of creating inconsistencies between having new detailed regulations and schemes, on the one hand, and the objectives of parental choice, school budgetary flexibility and efficiency of resource use, on the

other. It is difficult to resolve the primary-secondary funding disparity without a major reform of the methodology whereby central government allocates local government grants for education – a topic beyond the scope of this chapter.

Another key issue is that of a national formula for schools. While this would fund children equivalently throughout the country, its political drawback is that it removes local political discretion and, from the central government's point of view, makes it openly responsible for the amount spent on schools. It would also be difficult to implement without providing for some sensitivity to local school needs, unless there was to be a massive increase in funding. Some proposals advocate reforming the method by which central government allocates grants to local government, while retaining local discretion (for example, West, 1994). The formula for allocating grants to local government (the Standard Spending Assessment (SSA)) could be made more rational by making it activity led, so that it is clear how the annual change in nominal budgets matches changes in student numbers, in key costs such as teachers' salaries and in major educational innovations which require additional resourcing.

More narrowly, with respect to the funding formula, two major concerns stimulate further LEA modifications of their formulae: the justification for differences in per-student funding between grade levels (year groups), and improving methods of allocating additional finance for supplementary educational need. In investigating the first of these issues an increasing number of LEAs are reviewing activity-led funding (for example, West and Pennell, 1994), but have been constrained in implementing the results of these studies by the system-wide factors with respect to the SSA system and the grant-maintained sector. Special educational need is another key area in which LEAs are still actively reviewing and modifying their formulae. In general, there is a move away from just using social indicators and the development and wider application of educational tests and professional audit. The former are associated with the growing interest in value-added information as a crucial element in school evaluation and improvement.

It is difficult to improve the effectiveness, equity, transparency and administrative cost properties of English and Welsh LEA funding formulae unless there is a reform of the methodology and practice of central government funding of local authority educational spending. The English case illustrates well the fundamental point made in *Chapter 3*: a funding formula is an instrument of policy and needs to be designed as such. Its operation will help or hinder the implementation of educational policies and will itself be formed and constrained by them.

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Chapter 9

Case study 3: Formula funding of schools in the United States of America and Canada

Allan Odden

In the United States of America and Canada, school financing has largely addressed the issue of state-to-district formula funding. Although states and provinces have constitutional responsibilities for education, each state in the USA and each province in Canada has chosen to discharge this responsibility through local school districts. When these systems were developed over a century ago, their financing was generally devolved to local districts, which were given the authority to tax local property to raise funds for their school systems.

Because local property wealth per student, the local education tax base, varied widely across districts within states and provinces, local school districts faced different challenges in raising education revenues and spending on education programmes. Low-wealth districts often had low levels of expenditure even with high tax rates, while high-wealth districts often had high levels of per-student expenditure even with low tax rates. Although school finance policy and school finance formulae were developed to remedy these inequities, and often did to some degree, not until the end of this century did so-called state equalization formulae begin to substantially ameliorate the unequal abilities of local districts to raise revenues for public schools (Evans, Murray and Schwab, 1997).

As a result of this relentless attention to inter-district finance issues and the literal creation of an 'industry' designing state-to-district school finance systems, school finance policy in North America has mostly been concerned with financing districts (Odden and Picus, 1992) and has largely ignored the issue of financing schools. However, during the 1990s major changes have occurred in these emphases.

The origins of formula funding

Several policy initiatives in the late 1980s and early 1990s began to shift policy attention from the district level to the school site.

First, states began to enact public school choice programmes that allowed parents to choose any public school for their child to attend, instead of being forced to have their child attend the neighbourhood school. When parents selected schools outside of their school district of residence, however, states were faced with the challenge of tracking the flow of funds. To a considerable degree, states floundered in determining how to finance these new public school choice programmes; their difficulties flowed primarily from their inexperience in financing schools as compared with financing districts. Unfortunately, many states created cumbersome financing transfer systems as part of public school choice programmes, when the most straightforward way to finance such programmes was to simply count the number of students in the school attended and use already established school financing mechanisms (Odden and Kotowski, 1992). Such an approach triggered nearly all of the relevant revenue transfers.

The next school-based financing challenge involved charter schools. In most states, charter schools were public schools that operated largely independently from local school districts as well as from state education rules and regulations. When states enacted charter school legislation, they were faced with an even greater finance challenge than before – how to finance an individual school site as compared to a local school district. Again, states took many approaches to charter school financing, and some of these were quite cumbersome when more straightforward approaches were possible (see Odden and Busch, 1998).

The most significant factor that has begun to raise the issue of school-based financing in the USA is the current education reform movement, which has been called the standards- and school-based education reform (Massell, Michael and Hoppe, 1997; Fuhrman, 1993; Smith and O'Day, 1991). This reform strategy seeks to have the top of the education system (mainly the state and district) set curriculum content and student performance standards, measure student achievement results to those standards, administer an accountability system linked to the measured results, and then devolve to school sites responsibility for producing improvements in system and student performance. This strategy generally requires major changes in school governance, management and finance and, however labeled, requires a school-based management system (see Odden and Busch, 1998).

Odden and Busch (1998) argue that this approach to education policy also requires a school-based financing system. Although this element of education financing has not been enacted by any state in the USA or province in Canada, the connection is inexorable. Indeed, in both 1996 and 1997, the State of Minnesota explored, but did not legislate for, proposals to require districts to budget the bulk

of dollars to schools as part of their decentralization strategies. Odden and Busch (1998) present an adaptation of a paper written for Minnesota suggesting how that state should structure the budget devolution process; the paper and chapter drew upon strategies used in both Victoria, Australia and England, and outlined a state framework that would structure the dimensions of the process for districts to budget dollars to school sites through weighted student mechanisms.

In addition to Minnesota, the states of Arizona, Florida, Georgia, Ohio and Texas, to name a few, have begun to examine the possibility of incorporating a school-based financing requirement into their state education finance systems. As of December 1997, no USA state or Canadian province had designed or enacted such a policy. Nevertheless, the issue is rapidly creeping on to the North American education finance agenda and a good prediction is that in the near future some state or province will enact such a new finance element.

Local policy context for formula funding

On the other hand, the topic of school-based financing has not only moved on to the policy agenda of many large districts in the USA and Canada, but has also been implemented by several districts. For nearly 20 years, the Edmonton Public School system in the province of Alberta in Canada has been using a weighted per-student formula to provide lump-sum budgets for each of its schools. Initially, Edmonton adopted this policy to improve the efficiencies of its operations, under the assumption that schools could make more efficient decisions about how to spend resources on site needs than could the central office (Caldwell and Spinks, 1992).

During the past four years, however, another movement in urban education has provided the most recent stimulus for moving to a school-based financing system. This movement can be characterized as adopting dramatic new policies to improve student achievement. Numerous studies have shown that the levels of student achievement in many American cities is very low and that unless dramatic change is made, their students will be severely disadvantaged in participating in the family, social life, and labour markets of the future. These cities have come to believe that minor changes in their strategies and operations would be insufficient for the large changes they need to make in their student achievement results. As a result, several large cities have begun to adopt large-scale changes in both their curriculum and instructional programmes, as well as in their organization, management and finance systems.

Although, to a general degree, cities are crafting their own unique versions of standards- and school-based reforms, several

decided to join with the New American Schools (NAS) and to have their schools implement one of several 'whole-school designs' that have been created by NAS. NAS is a business-financed initiative, begun by President Bush and supported by President Clinton, to create 'break the mold' school designs to teach students to higher standards. Today, NAS offers districts and schools eight different whole-school, high-performance designs (Stringfield, Ross and Smith, 1996). The curriculum, staffing and organization of these designs are quite different from the typical American school. They have been shown to produce better student achievement results and show promise for accomplishing the goal of teaching all students to high standards (Fashola and Slavin, 1997). In most districts, these programmes also can be funded with dollars already in the education system (Odden, 1997).

Beginning in mid-1995, nine big city districts, together with the states of Kentucky and Maryland, joined together to have at least 30 percent of their schools select a design and restructure themselves into the design over a three-five year time period. Although these education systems all had some version of state and district standards, testing, and accountability, they did not have a common state or common district curriculum programme. Under the NAS approach, a specific school curriculum is provided by each of the different schools designs, although each curriculum must be aligned with district and state standards.

As districts and states began to implement these rather bold new initiatives, they learned that their efforts to decentralize curriculum specifics to each school site required a dramatic decentralization of the organization, management, and finance of their school systems. They learned that they needed to redesign nearly all of their school system operating procedures (Odden and Busch, 1998) including creating and implementing a school-based financing system. The latter is required because the cost structure and use of site resources is quite different across the seven different designs, and schools need budget authority to reallocate extant resources to the requirements of their chosen designs (Odden, 1997). Further, reports on both the implementation of the NAS demonstration sites for each school design, as well as reports on the first year's experience in the nine districts and two states having schools select and implement a NAS design, concluded that schools' control over their fiscal resources was needed for implementation to proceed, but this had not been one of the decision-making areas that districts had delegated to schools (Bodilly, 1996; 1998). As a result, many of these districts began to create and implement new school-based financing policies.

Thus, the policy context for the four large USA districts included in this chapter is that their new school-based financing systems are part of their efforts to dramatically decentralize their school

systems by having schools select among different high-performance whole-school designs and restructure into those designs, including reallocating their site resources to the needs of their selected designs. Put differently, the four school-based financing formulae discussed in this chapter are part of large-scale, urban school district redesign and decentralization efforts, adopted for the purpose of substantially improving student achievement to high and rigorous standards. These broader goals – linking decentralization to fundamental school improvement – have now been added to the decentralization and school-based financing policies in Edmonton as well.

Thus, all of the districts discussed in this chapter are implementing school-based financing efforts as part of broader strategies to improve the student academic achievement of their education systems. This rationale is quite different from the original purpose for decentralizing finance in Edmonton – simply to improve the efficiency of school operations. Efficiency gains might be produced with the current round of financial decentralization, but the overriding goal is to dramatically improve student achievement, the general strategy selected is decentralization to school sites, and districts have had to design school-based funding formulae to implement their overall decentralization strategies.

School budgets: centralized and delegated portions

In the USA, there is only the beginning of a conversation about what percentage of a Total Schools budget should remain at the district level and what percentage should be delegated to school sites as part of decentralization efforts. Unlike the rather sophisticated programme in England which, from the very beginning, included an assessment of which functions were centre-based which site-based, and which might be either (Coopers and Lybrand, 1988; Thompson and Larkin, 1997), school-based financing in the USA has proceeded largely without this analysis. For example, state approaches to charter school financing, the first state-directed school-based financing initiative in the United States, focused in the initial years on whether state aid should follow the child and how local money should or should not be part of charter school financial regulations (Odden and Busch, 1998, Chapter 3). This policy conversation addressed only state and local dollars, with little regard for services provided or tasks to accomplish. Not until the late 1990s did the issue of functional allocation by level of the system enter into policy deliberations over charter school financing.

At the district level, which is the focus of this chapter, there has been more attention given to the assignment of functions between school sites and the district office, but until recently, the discussion

has been driven by the perceived ease of budgeting rather than an assessment of what should be retained at the centre when the district decentralizes and what should be decentralized to each school site.

Table 9.1 provides an illustration of this issue. The table identifies the functions that have been retained at the central (or district) office and the functions that have been delegated to schools. It also provides estimates of the percentage of total schools budget allocated to each function. The second to last row shows the percentage of the operating budget retained by the central office and the last row shows the percentage delegated to school sites. These latter figures, ranging between 50 to 80 percent, represent the amounts that are allocated by school-based financing formulae. The percentage figures are quite striking. All figures are substantially below the nearly 90 percent of the budget that is devolved to school sites in England.

Some caution must be used in reading the exact percentage figures in *Table 9.1* because the definitions of functions are not precisely the same across all districts. In creating the table, care was given to the degree possible in grouping functions and areas into similar categories, but the resultant grouping and the related budget figures should not be viewed as exact. Nevertheless, the table does show the central tendencies of the school-based funding programmes. First, no district had a background document that suggested what should be centre-based and what should be site as part of their new decentralization programmes, although some of this analytic conversation was beginning to occur (see Odden and Busch, 1998). Second, because these were all district programmes, there were specific functions retained and specific functions devolved and nothing in-between, as was the case in England. Third, all five districts retained transportation at the central office. Two of the five districts (Pittsburgh and Seattle) retained funding for special education and compensatory education, but were hoping to devolve those dollars at some time in the future. Broward was able to devolve those dollars in part by using the same weighted student counts as the state did in providing state aid; the same was generally true in Edmonton. Fourth, most of the districts, except Edmonton, retained the large bulk of central office functions for instructional and student support, even although it could be argued that these central office functions should be downsized as a natural part of their decentralization strategies; each function was handled by the design each school selected. Fifth, it is not clear from the data how much the central personnel office retained because, again, this is a function that should largely be devolved in a comprehensive decentralization effort, especially the ones chosen by those districts. In short, these districts decentralized a substantial portion of the operating budget, ranging between 50 and 81 percent, their decisions

Table 9.1. Functions retained at Central Office and functions delegated to schools (including percentages of budget retained and delegated)

Functions retained	School system				
Retained	Broward	Cincinnati	Edmonton	Pittsburgh	Seattle
Central Administration	NA	NA	6.5%	4.4%	9.0%
Logistics/Other support	NA	NA	11.0% (transport, debt, and miscellaneous)	25.0%	17.0% (operations maintenance, food, transport, and miscellaneous)
Central Instruction and instruction support	NA	NA	1.6% (continuing education)	2.6%	13.5% (special education bilingual education and Title I)
Categorical grants	NA	NA	0%	0%	10.1%
Other	4.0% (reserves)	NA	0%	0%	1.4% (reserves)
Total retained by Central Office	20%	23.6%	19.1%	32.0%	50.8%
Delegated to schools	80.0%	76.4%	80.9%	68.0%	49.2%

Note 1: All school systems except Broward permit school site surpluses to be retained and carried over to the following year.
Note 2: NA = Information not available.

on which functions were retained at the centre varied significantly, and there is still ample room for more substantive analysis to determine which functions ought to be retained and which ought to be devolved.

The design of the funding formula

Tables 9.2 to *9.6* show the components, dimensions and indicators for the various elements of the school-based financing formulae for each of the five school districts. As a quick review of each table shows, all five formulae have an allocation for each full-time equivalent (FTE) student, adjustments for different grade levels, provisions for specific curriculum enhancements (except for Seattle), numerous additions for the special needs of several categories of students, and school-specific site costs. In other words, these school-based financing formulae address a comprehensive range of issues that relate to students, education levels, the curriculum, specific student needs and different needs of each school building.

Two districts, Broward County and Edmonton, Alberta, use a full-time equivalent (FTE) student count and three districts – Cincinnati, Pittsburgh and Seattle – use a simple enrolment student count, although Cincinnati uses an FTE count for vocational education funding. FTE student counts have been used for years in those states (and districts) that have a weighted student count for identifying and financing the extra needs of students caused by physical or mental disability, economic disadvantage, or whatever. For these programmes, each student is counted the percentage of time they participate in different programmes, and programme costs are set at a level assuming full-time provision. These distinctions – the FTE versus the simple head count of enrolment – must be recalled when student weights or extra dollars per student representing programme costs are assessed in order to make meaningful comparisons.

For example, assume the base programme cost is $5,000 per child. If a particular programme costs an extra $4,000 to provide full time, and each eligible child is in the programme full time, then that child would be weighted 1.8 (0.8 times $5,000 = $4,000). On the other hand, if the programme costs $4,000 to provide but a child participates only 50 percent of the day (week or year), then the child would be weighted only 1.4 in an FTE student count, and the school would receive an extra $2,000. The cost for the same programme would be set at $2000 per student for places using an enrolment or head count of students. The point is that an FTE student count is different in many ways from a head count of students enrolled, and these differences must be considered when interpreting both student weights as well as extra per-student amounts for special programmes.

Table 9.2. Relationships among components, dimensions, and indicators in Broward County

Components	Dimensions	Indicators
Component 1: Basic student allocation		
1(a) Basic allocation	1(a) Total enrolment	1(a) FTE students
1(b) Grade-level supplement	1(b) Enrolment differentiated by grade and need	1(b) FTE students weighted – using three categories of grade-level weights (K-3, 4-8, 9-12), 15 of need basic mainstream, ESL, exceptional, etc.) and 10 of vocational for Grades 7-12
Component 2: Curriculum enhancement		
	2(a) Specialist school 1	2(a) FTE students in Magnet schools
	2(b) Specialist school 2	2(b) FTE students in Prevent drop-out schools
	2(c) Specialist curriculum	2(c) FTE students in 10 vocational categories
	2(d) Other programmes	2(d) Fixed amounts for small programmes
Component 3: Student supplementary educational needs		
	3(a) Socio-economic status	3(a) FTE students teenage parents
	3(b) Non-fluency in language	3(b) FTE students non-English speaking
	3(c) Disabilities 1	3(c) FTE students in mainstream special education
	3(d) Disabilities 2	3(d) FTE students in 15 categories
	3(e) Low educational attainment	3(e) Number of middle school and 10th Grade students below 18th percentile in reading and mathematics on Stanford Achievement Test
Component 4: School site needs		
	4(a) School size	4(a) FTE students with adjustment for small schools

Table 9.3. Relationships among components, dimensions, and indicators in Cincinnati

Components	Dimensions	Indicators
Component 1: Basic student allocation		
1(a) Basic allocation	1(a) Total enrolment	1(a) Number of students
1(b) Grade-level supplement	1(b) Enrolment differentiated by grade	1(b) Number of students weighted – using three categories of grade-level weights (K-6, 7-8, 9-12)
Component 2: Curriculum enhancement		
	2(a) Specialist school 1	2(a) Number of students in major Magnet
	2(b) Specialist school 2	2(b) Fixed amount for minor Magnet schools
	2(c) Specialist curriculum	2(c) FTE students in all vocational categories
Component 3: Student supplementary educational needs		
	3(a) Socio-economic status	3(a) Number of students with free/subsidized lunch
	3(b) Disabilities	3(b) Number of students in nine disability categories
Component 4: School site needs		
	4(a) School size	4(a) Number of students with adjustments for small schools
	4(b) School site base allocation	4(b) Fixed amount for each school site
	4(c) Other site factors	4(c) Amount based on previous year's costs

Table 9.4. Relationships among components, dimensions, and indicators in Edmonton

Components	Dimensions	Indicators
Component 1: Basic student allocation		
1(a) Basic allocation	1(a) Total enrolment	1(a) FTE students
1(b) Grade-level supplement	1(b) Enrolment differentiated	1(b) FTE students weighted – using two categories of grade-level weights (K-8, 9-12)
Component 2: Curriculum enhancement		
	2(a) Specialist curriculum	2(a) FTE students in several small programmes (reading, high enrolment growth, foreign language, and new programmes)
Component 3: Student supplementary educational needs		
	3(a) Socio-economic status	3(a) FTE students with high mobility and low income
	3(b) Non-fluency in language	3(b) FTE students with language not English
	3(c) Disabilities	3(c) FTE students with mental/physical disability weighted using six categories ranging from mild to severe
Component 4: School site needs		
	4(a) maintenance	4(a) Amounts related to 75% floor space and 25% weighted FTE students

Table 9.5. Relationships among components, dimensions, and indicators in Pittsburgh

Components	Dimensions	Indicators
Component 1: Basic student allocation		
1(a) Basic allocation	1(a) Total enrolment	1(a) Number of students
1(b) Grade-level supplement	1(b) Enrolment differentiated by grade	1(b) Number of students weighted using three categories of grade-level weights (K-5, 6-8, 9-12)
Component 2: Curriculum enhancement		
	2(a) Specialist schools	2(a) Number of students in Magnet schools (creative/ performing arts and vocational)
Component 3: Student supplementary educational needs		
	3(a) Socio-economic status 1	3(a) Number of students with free/subsidized lunch
	3(b) Socio-economic status 2	3(b) Number of students with single parent or in institution, foster home, or with guardian
Component 4: School site needs		
	4(a) School size	4(a) Number of students with adjustments for schools smaller than 300 students

Table 9.6. Relationships among components, dimensions, and indicators in Seattle

Components	Dimensions	Indicators
Component 1: Basic student allocation		
1(a) Basic allocation	1(a) Total enrolment	1(a) Number of students
1(b) Grade-level supplement	1(b) Enrolment differentiated by grade	(b) Number of students weighted using 4 categories of grade-level weights (K-3, 4-5, 6-8, 9-12)
Component 2: Curriculum enhancement		
	———	———
Component 3: Student supplementary educational needs		
	3(a) Socio-economic status	3(a) Number of students with free/subsidized lunch
	3(b) Non-fluency in language	3(b) Number of students non-English speaking
	3(c) Low educational attainment	3(c) Number of students below 30th percentile using three categories of decile-level weights
Component 4: School site needs		
	4(a) School-site bases allocation	4(a) Fixed amount paid to schools that meet minimum size targets (elementary: 250, middle: 600, high: 1,000)

All districts make distinctions in budgeting dollars by different levels of schooling – elementary – (sometimes divided between primary years and upper elementary years), middle-and high-school students. Although the specific Grades that these different school levels represent vary somewhat among the five districts, that variation is quite small, and usually concerns whether Grade 6 is part of an elementary school or a middle school. Most high schools are for four years and include Grades 9-12.

It is important to note that none of the education-level differences are related to different stages of student learning as is true of many formulae in England and Australia (see later chapters). Although all five districts are in the process of developing or implementing a standards-based curriculum reform programme, with either state (province) or district standards and sometimes both, none specifically linked differences in dollar allocations to any learning stages in their curriculum standards. At the same time, most of the standards that exist are for Grades 4, 8 and 10. Although the Grade 4 standard could be roughly equivalent to an end-of-elementary learning stage, and the Grade 8 standard could be roughly equivalent to an end-of-middle school learning stage, there are no funding distinctions related to these levels or curriculum stages, and there are no funding distinctions between the Grade 10 and upper high school programmes. In short, although every district provides a differential level of funding by education level, largely elementary, middle and high school, none explicitly connects these differences to any stage of learning or any level in their curriculum standards.

Curriculum enhancement is a formula component that is addressed in several different dimensions. In addition, provision for curriculum enhancement varies considerably across the five districts, ranging from numerous curriculum enhancement adjustments in Broward County to no adjustments in Seattle. Three districts – Broward, Cincinnati and Pittsburgh – provide extra money for magnet programmes, which generally are part of desegregation efforts. Broward County and Cincinnati provide adjustments for vocational education programmes in their high schools. Interestingly, the two districts with FTE student counts, and a long history with weighted student funding formulae, also have numerous, additional small programmes with specific curriculum emphases, all part of their school-based funding policies. The indicator for curriculum enhancement adjustments is usually a student count with an extra amount provided for each student, except for magnet programmes, where the indicator is the 'theme' of the magnet programme and the amount of extra money is based on the specific requirements for the magnet theme, adjusted of course to the student size of the schools.

Although all five districts have not yet included funds for all major student-specific factors in their new funding schemes, the goal

of all districts is to do so. The general goal is to include adjustments at least for students from a family with low-income, students with physical or mental disabilities, students with limited English proficiency, and students achieving at a very low level. Currently, there are several dimensions of student-specific factors that are recognized. All districts have some mechanism for providing aid for disabled students, and usually those students are divided into categories that vary with the intensity of extra services provided. Although all USA districts have funds from the federal Title I programme, which provides extra resources for low-achieving students from low-income families, Cincinatti, Edmonton, Pittsburgh, and Seattle also provide adjustments from state and local revenue sources for students from low-income backgrounds. Seattle also has an adjustment for students with low levels of student achievement and Pittsburgh includes a family-context variable – percentage of students not living in a two-parent family – that triggers extra funds. Three districts – Broward, Edmonton and Seattle – include adjustments for students with limited proficiency in English. Finally, Broward County has a number of additional categories of special student needs, including being a teenage parent. In each case, the indicator generally is either the head count or enrolment count of students with the specified special needs or an FTE student count. The point here is that all of these programmes have numerous adjustments for special student needs across several student-need dimensions, even although not all of the special adjustments are currently included in the school-based financing formula.

When the special students needs programmes are not part of the delegated budget, however, the resources for these dimensions of student need are often still provided to school sites. For example, each school in the four USA districts receives a dollar allocation from the federal Title I programme, and is able to spend it as it wishes. Each school also receives extra staffing resources if it has enrolled disabled students. The point is that while not all dimensions of student-specific factors are included in the school-based financing formulae, the resources for those dimensions are often provided to school sites via another and separate formula, and sometimes the schools have authority over how these dollars are spent.

Finally, each district also has a component of the school-based financing formula that is based on school-specific factors. Two major dimensions and one unique dimension is used. Broward and Cincinnati use the dimension of size, measured by the number of students, and have size adjustments which provide additional funds for schools, depending on their overall enrolment, usually enrolment below a certain level. Cincinnati and Seattle use the dimension of school site and provide for a base allocation for each school site; the base allocation is intended to provide an amount of administrative staff for a school.

Cincinnati also has several additional school-based factors. Finally, Edmonton also uses the dimension of school site, but more specifically the level of routine maintenance needed, and adjusts all budgets by that amount.

(a) Component 1: Basic student allocation

Table 9.7 displays the allocation for the student weighted 1.0 and the grade-level weights for all other students used in each of the five school district funding formulae. The reader should take great care in interpreting these weights, especially across school districts, first, because the amount of the budget provided to each site as a percentage of the total operating budget varies significantly and, second, because even for the school budget, the base allocation provided to each site is quite large and varies so dramatically, thus reducing the amount provided by the student-weighted portion of the formula. In addition, the overall spending varies across the five districts, a fact which can also affect the substantive meaning of the different weights.

With these caveats in mind, the data in *Table 9.7* can be reviewed. Several observations are in order. First, the different weights apply to students in different grade levels only. That is, not specifically to students of different ages or students at different stages of the curriculum that might be reflected in the curriculum content or student performance standards. So the practice in North America is to provide student weights largely by education level.

Second, three of the districts use a fully developed weighted-student approach, while Broward and Cincinnati provide a different amount for each elementary-, middle- and high-school student. For Broward and Cincinnati, some caution should be used in assessing the different grade-level weights because all districts also provide large base allocations, which vary widely across the three levels, and they also provide a very large size adjustment. The result is that it may be inappropriate to impute the differences in the allocations in *Table 9.7* for Broward and Cincinnati as a student weight. The general conclusion, however, is that North American districts use a weighted student funding approach.

Third, there are three distinct patterns for the grade-level weights. The grade-level weights in Pittsburgh follow the usual pattern of higher weights for secondary than for primary school students. Indeed, the weight is 1.0 for elementary students, 1.384 for middle-school students, and 1.505 for high-school students. The grade-level weights for secondary students in Pittsburg exceed the magnitude of weights in most state-to-district finance formulae (Odden and Picus, 1992).

Table 9.7. Allocations and grade-level weights in five school districts

Allocation/ Unit/Weight	Broward	Cincinnati	Edmonton	Pittsburgh	Seattle
Allocation (for student with weight of 1.0)	Elem: $1868 Mid: $1931 High: $1802	Elem: $3051 Mid: $3488 High: $3011	All: $3127	All: $4632	All: $2411
Unit (to which weight is applied)	FTE Student	Student	FTE Student	Student	Student
Weight (applied at each Grade level)					
Grade K	1.234	1.01	1.0	1.0	1.0
Grade 1	1.234	1.01	1.0	1.0	1.0
Grade 2	1.234	1.01	1.0	1.0	1.0
Grade 3	1.234	1.01	1.0	1.0	1.0
Grade 4	1.0	1.01	1.0	1.0	0.94
Grade 5	1.0	1.01	1.0	1.0	0.94
Grade 6	1.0	1.01	1.0	1.384	0.87
Grade 7	1.0	1.16	1.0	1.384	0.87
Grade 8	1.0	1.16	1.0	1.384	0.87
Grade 9	1.179	1.0	1.03	1.505	0.88
Grade 10	1.179	1.0	1.03	1.505	0.88
Grade 11	1.179	1.0	1.03	1.505	0.88
Grade 12	1.179	1.0	1.03	1.505	0.88

223

The weights in Edmonton are also higher in the high school than at the lower Grade levels, but only very modestly so. Grade 9-12 students are weighted just 1.03 compared to elementary students, and middle-school students are weighted the same as elementary-school students. It would be more accurate to say that Edmonton essentially had no weights for grade-level differences.

On the other hand, the weights in Broward and Seattle are lower in middle and secondary schools than in elementary schools. In other words, Broward and Seattle provide more revenues per student for young students than for older students, a practice reflecting a belief that early intensive education for children, with the goal of developing solid literacy and numeracy expertise by the end of elementary school, is a more cost-effective use of local and state fiscal resources.

When the base allocations are factored into the Cincinnati formula, the result is a secondary allocation that is a few hundred dollars per student higher, or about 10 percent more. Otherwise, the data in *Table 9.7* show that Cincinnati provides about the same base funding for elementary – and high-school students, and about 10 percent more for middle school students, a unique practice.

The difference in practices among these five districts is quite striking. The typical practice in spending across school levels is for higher expenditures on secondary students (OECD, 1995). Indeed, one of the primary contentions that has emerged as governments have shifted funding to the school site has been the higher funding of secondary students. Yet Pittsburgh was the only district to provide such differential funding to secondary students. The other districts either provided no, or very small, distinctions between elementary and secondary students, or actually weighted the system in favour of elementary-school students. In this sense, the grade-level weights in these five school districts represent quite different resource allocation decisions.

Although the grade-level weights adopted by these five jurisdictions cannot be taken as indicative of practice across North America, they nevertheless reflect a major fiscal value shift in the basic allocation of resources for these districts, away from the traditional bias towards higher funded secondary students and towards a new bias of greater funding for elementary students, particularly elementary students in Grades K-3. As stated above, the rationale for this shift in the resource allocation process is to develop the basic skills early in the elementary school career of a child, under the assumption that if students can read, write and do mathematics proficiently by Grade 3, then teachers at higher Grades have virtually an unlimited horizon for student achievement expectations. Of course, this also reflects the obverse of this proposition – that late intervention for secondary students who have not developed good literacy and numeracy skills, is not only inefficient but also very difficult to make effective.

(b) Component 2: Curriculum enhancement

Table 9.8 shows that the five districts provide curriculum enhancement funds for magnet schools, vocational education, foreign language and drop-out prevention programmes. In North America, magnet schools have been created as a way to encourage voluntary behaviour to desegregate schools, largely in school districts where racial segregation is caused by housing patterns, not legal or regulatory decisions of school districts. The idea is for a school to adopt a thematic focus that will serve as a 'magnet' for students from both minority and non-minority ethnic backgrounds to voluntarily enroll. The hope is that by providing attractive school options, a district can reduce racial isolation in all schools and increase the number of schools with a mixture of student ethnicities, all accomplished through voluntary actions of parents and students.

Broward, Cincinnati and Pittsburgh provided extra funds for magnet schools. Broward provides about $10 million for 32 different theme-based magnet programmes at all levels – elementary, middle and high school. Cincinnati provides extra funds for magnet schools that have four major themes: Paideia, Montessori (drawing from the Montessori pre-school programme), foreign language, and arts enrichment. The per-student extra costs of these magnets range substantially: from a low of $374 per student at elementary level, to $1,274 per student more at high-school level. Cincinnati also has several minor magnet programmes, with funding that ranges from $10,000 to $65,000 per school. When Cincinnati fully adopts a school-based funding policy in 1998-1999, it will probably retain, but not expand, the number of magnet schools. Indeed, since Cincinnati is encouraging all schools to adopt a high-performance school design, and thus become a school with a specific thematic emphasis, the notion of separate magnet schools will be somewhat outmoded. However, the districts will find it politically difficult to discontinue extra funding for existing magnet schools. Pittsburgh provides a much smaller level of extra funding for magnet schools, ranging from an extra $11 to an extra $126 per student. Pittsburgh's programme included only three magnet schools in 1997-1998 of a total of 21 school-based financed sites; the number of magnet schools could increase in the future as all of Pittsburgh's schools are included in school-based funding programmes.

Vocational education funding enhancements constitute the second major adjustment related to the programmatic nature of the curriculum. Extra funding for vocational education in high schools has a long tradition in North American school funding (see Odden and Picus, 1992). Broward included nine different vocational education weights in its school-based funding formula, largely following the vocational education weights used by the State of Florida to fund

Table 9.8. Curriculum adjustments in five North-American districts

Activity	Broward	Cincinnati	Edmonton	Pittsburgh	Seattle
Magnet schools	$10.1 million for 13 elementary, 10 middle and 9 high schools. Varying formulae for extra staff and materials	Major: Per-student amounts from $374 to $1,274 Minor: Per-school amounts from $10,000 to $65,000	NA	Per-student amounts from $100 to $126	NA
Vocational education	Weighting factors ranging from 1.211 to 1.651 for special programmes, and a weight of 1.963 for mainstreamed programmes	Overall FTE adjustment across all programmes	NA	NA	NA
Foreign language	NA	NA	Differential rates for 12 different language programmes	NA	NA
Drop-out prevention	Weighting factor of 1.458	NA	NA	NA	NA

Note: NA = not applicable.

each school district. The weights were 1.963 for mainstreamed vocational education programmes, nearly a 2.0 weight, and for separate vocational education programmes ranged from 1.168 for exploratory programmes to 1.651 for industrial arts programmes. Cincinnati provided a uniform overall adjustment for vocational education per FTE across all vocational education programmes. Both Pittsburgh and Seattle retained vocational education funding at the central district office and did not delegate these resources to their high schools.

Edmonton provided funds for teaching foreign languages, with funding for 12 different foreign language programmes. Funding depends both on the number of foreign language programmes offered in a school, and the enrolments for each.

Broward also applied a weighting factor of 1.458 for drop-out prevention programmes. A possible reason for the extensive use of student weights in Broward is that this has been the manner in which many special needs have been addressed in Florida for years. Florida has the most extensive system of student weighting in the entire USA (Gold et al., 1995). Broward includes nearly all of the state weights in determining each school's budget.

(c) Component 3: Student supplementary educational needs

The five districts have created a multitude of adjustments for the special educational needs of their students. From local and state resources, they provide adjustments based on sociodemographic characteristics, achievement scores, English language fluency, and both mental and physical disability. The richness of the various adjustments indicates that there is a professional ethic among these districts that it is right and good to provide extra revenues so that teachers can provide additional services to students who have exceptional educational needs.

(i) *Economic or education disadvantage:* Although all four USA districts receive substantial funds for low-achieving students in low-income communities from the federal Title I programme, both Pittsburgh and Seattle supplemented this provision with augmentations based on socio-demographic status. Seattle provided extra funding for students eligible for the federal free and reduced price lunch programme, a programme that provides a free lunch to students from a family with an income below the poverty level (about $16,000 for an urban family of four) and reduced-price lunches for students from families with an income up to 150 percent of the poverty level (about $24,000), recognizing that poverty is a general indicator of the need for additional teaching services. The weights are 0.087, 0.109 and

0.18 providing $212, $266 and $439 for elementary-, middle- and high-school students.

The Pittsburgh programme averages the percentage of students in a school eligible for free and reduced price lunch with the percentage of students not living with both parents, multiplies that percentage times the school enrolment, and provides an extra $400 for each such student. Both of these amounts are in addition to the Title I school allocation, which is provided according to a different formula, and can reach $900 per student in high-poverty schools. Neither Broward, Cincinnati nor Edmonton provide an additional amount based on these factors, although Cincinnati is considering adding such an adjustment.

Broward and Seattle also provide extra resources for students scoring below certain levels on the district's test of student achievement. Broward provides this enhancement only for middle and high schools, and splits the district's overall allocation of about $2 million among the numbers of students scoring below the 18th percentiles on the reading and mathematics portions of the Stanford Achievement Test. Seattle provides a small extra weight for students scoring at or below the 30th percentile. The weight is larger the lower the percentile (i.e., the lower the achievement), and the weight is larger for students in Grades 9-12 than it is for students in Grade K-8.

The dilemma in providing funding adjustments based on actual student achievement is that the funding is lost when achievement is improved. So unless the achievement score is based on performance from another level of schooling, the workings of such a funding augmentation can sometimes be awkward.

(ii) *English language proficiency and disability:* Broward, Edmonton and Seattle provide adjustments for limited-English-proficient students – that is, for students who need help in developing English language fluency. All three districts provide an extra weight for such students. The extra weights in all three districts are around the 25 percent level, but because they are applied to different base amounts, they provide different levels of extra funds, amounting to approximately $475 more per student for each student in Broward, about $850 more per student in Edmonton, and an extra $635 for each elementary student, and just over $1,000 more for each high-school student needing help learning the English language in Seattle.

The strategies these districts use for providing extra revenues for physically and mentally disabled students are the most complex. Broward, Edmonton, and Seattle use student weights,

whereas Cincinnati and Pittsburgh continue with separate formula allocations. Broward County has the most extensive list of extra weights, with elementary -, middle- and high-school weights for mainstreamed special education students, eight different weights for separate full-time programmes and seven different weights for part-time programmes. The weights vary quite widely, reflecting the nature of the disability and the intensiveness of the services required.

Edmonton and Seattle have taken a somewhat less detailed approach. Edmonton provides weights in six different categories, with a less and more intense division for three levels of need – mild, moderate and severe disabilities. They list specific handicapping conditions under each of the size-weighting categories. However, Seattle has identified five categories of special needs, and provides weights for just these five, sometimes but not always differentiating the weight by Grade level within the category. Seattle does not identify a long list of the more traditional disability conditions within the five categories; it is seeking to identify the intensity of the service required rather than the label of the handicapping conditions.

Again, some care needs to be used in interpreting the different weights. Since the 1.0 weight allocation varies across these districts, the same weight triggers quite different levels of additional resources. For example, an extra weight of 1.0 in Broward would generate about $1,900 more, while the same extra weight would produce $3,127 in Edmonton and $2,441 in Seattle. These are very different levels of extra resources. The point here is that the extra weights themselves should not be compared across districts because the dollar levels to which they are attached are so different. The only reasonable way to compare how the districts treat students with disabilities is to calculate the dollar amounts that are actually provided.

For nine categories of disability, Cincinnati provides an extra amount for each student, with constraints concerning maximum class size for each different category. The district holds the funds for more special education support, including psychologists, special education service centre, tutoring, home instruction, medicaid reimbursement, audiological services and general services. When the programme is fully implemented, Cincinnati plans to convert the dollar figures to student weights.

In 1997-1998, Pittsburgh did not provide schools with much authority over the substantial resources in the system for students with disabilities. The district is investigating how it could devolve this budget authority, together with several other categorical programme revenues, in the future, but decided for

1997-1998 to retain central control over resources for special education services and programmes.

(d) Component 4: School site needs

(i) *School site allocation:* Three districts provide base allocations – Broward, Cincinnati and Seattle. The first aspect of these base allocations is that they are quite large, ranging across all districts from $175,000 at the elementary level to over $1.2 million for a high school. For an elementary school of 500 students, this provides a base of about $350 per student; for a high school of 1,500 students, this provides a base of about $800 per student.

For all three districts, the middle and high school base allocations are substantially larger than the elementary allocations. Indeed, in Broward, the middle school base allocation is nearly twice as large as the elementary base allocation, and the high school allocation is about three times the elementary allocation. In Cincinnati, however, the base allocation for middle schools is only slightly higher than that for elementary schools; the base allocation is to provide a principal, a librarian or librarians for high school, counsellors at the high-school level, a physical plant operator and curriculum funds.

In Broward, moreover, the base allocation is provided for the smallest sized elementary, middle and high school and then increased by several thousand dollars (the amount rising by education level) for higher enrolment levels. For example, a middle school with 860 students would receive a base allocation of about $840,000. But for every additional 100 FTE, it would receive between $13,000 and $43,000 more, the extra amount varying at different levels of the 100 student increments. The point is that larger schools receive an even larger base allocation.

In sum, three districts provide a base allocation which is meant to provide a relatively high level of basic school resources, not just the bare minimum administrative staff for a school, and the base tends to be substantially larger for high schools than for elementary schools.

(ii) *Adjustments for small school size:* These adjustments are provided to ensure that small schools have sufficient funds for a small, minimal core of administrative staff – perhaps a principal, a school secretary and a clerk. But the size of these base allocations allows them to provide more than just a minimal, core base of administrative staff. Cincinnati provides a higher per-student amount for small elementary ($450), small middle

($253 per student) and small high schools ($778). Pittsburgh provides $675 per student for the difference between the actual school enrolment (under 300) and 300, essentially a small-school enhancement. So a school with 250 students would receive $33,750 more, and a school of 200 would receive $67,500.

Assessment and analysis

(a) General structure of the formulae

The five school-based financing formulae discussed above represent quite sophisticated innovations in school financing in North America. Although Edmonton has been implementing its school-based financing system for over two decades, the formulae in the other four districts are very new – three are being implemented for the first time during the 1997-1998 school year. The fourth, in Cincinnati, is scheduled to be implemented in 1999-2000, although several pilot schools in Cincinnati have authority over their budget in 1997-1998 (with the budget amount being calculated according to the traditional school staffing formulae). Cincinnati will also show schools what their school-based budget would have been in 1998-1999 if they were to implement the programme in that year, so schools can begin to plan for the budget that formula funding will provide the next year.

Given the newness of these formulae, their comprehensiveness and their sophistication represent a substantial accomplishment. Only time will tell how the formulae evolve, particularly with respect to funding for categorical programmes. But for first-year efforts, the formulae represent a carefully considered and major step towards school-based financing.

More thought needs to be given to central functions versus site functions in at least the four USA districts. Since these districts are part of the New American Schools and will ultimately allow each school to select and restructure into a whole school design, they need to redesign their entire school system to one that supports a decentralized management system. As part of this process, they need to shed, or at least dramatically downsize, some central office functions (for example, curriculum support, personnel, and business operations) and strengthen others (for example, planning, evaluation, accountability, and information systems) and adjust the central office budget accordingly. All other functions and their budgets should be devolved to schools. Although these districts have engaged in this analytic process to some degree, it should become a central focus and the retained versus delegated budget shares should be traceable back to these decisions. This is not now the case.

The formulae developed to date are all relatively comprehensive – with basic allocations for students, Grade-level enhancements, curriculum enhancements, several adjustments for specific student needs, and adjustments for school sites in terms of base allocations and small-size augmentations. In other words, all districts have taken a range of school resource needs into serious consideration in designing their funding formulae.

(b) Transparency

In Edmonton, Pittsburgh and Seattle, the formulae are all public and transparent. Indeed, they are on a World Wide Web site in both Edmonton and Seattle, and thus transparent to the entire world! All budget documents are also available in public libraries in Edmonton. On the other hand, the formulae in Broward, while public, are buried in thick budget documents and are not easily accessed. It is difficult to comment on the transparency of the Cincinnati formulae as they will not be used until the 1999-2000 school year. Current Cincinnati budgets are transparent, but not all aspects of the construction of the formula are described in documents that are widely distributed.

Not only is the Seattle funding formula available to the entire world on the Web, but also principals are able to construct their new school budgets on the Web site. Seattle is beginning to show how the power of computer technologies, via the Internet, can be tapped in creating and operating these new types of decentralized policies.

(c) Equity

Because all formulae have numerous dimensions which address differential site, student and educational needs, it would be fair to say that they represent honest efforts to design and implement a funding system that is equitable. When Pittsburgh decentralizes its budgets for the federal Title I programme and for special education, all five programmes overall will represent quite comprehensive and sophisticated attempts to make school-based funding equitable across several issues. Although there could be some debate concerning the exact magnitude of many of the weights and adjustments that have been provided, it is still quite clear that these five districts have attempted to design fair and equitable school based-funding systems which recognize a variety of special circumstances.

Perhaps the most unexpected equity element of the formulae is the weighting in favour of elementary students in Broward and Seattle, and the near equal allocation across education levels in Edmonton, practices very different from the traditional higher weighting for secondary

students. The different approaches used in this area highlight an area of educational management that deserves more scholarly attention to establish whether historical approaches to providing more resources to older students continue to have merit.

(d) Efficiency

Since these school finance programmes have been in effect only since the beginning of the 1997-1998 school year (except for the long-running programme in Edmonton), it is hard to comment on efficiency issues by pointing to data or results. At the same time, some speculation about efficiency can be made.

The first is that the new school-based funding formulae in the USA have delegated resources for the regular instructional programme and site administration, but are quite varied in the degree to which they have delegated resources for other functions. One such category is funding for the special needs categorical programmes for disabled students and students from poverty backgrounds, which can constitute up to 30 percent of a site's budget and account for a large amount of resources that can be reallocated to more efficient uses (Odden, 1997). These programmes represent big funding pools that could potentially be more efficiently deployed at the site level, particularly since research on the previous use of these funds has produced few positive effects. Further, the districts have been reluctant to delegate authority over operation and maintenance, another function where efficiencies can be produced at the site level. Finally, the districts have been slow to downsize central office staffing, curriculum and business offices, and then devolve those funds to the site level. So while the funding formulae represent substantial movement towards delegating district financing to school sites, in their current form they fall short of devolving the fullest possible amounts.

(e) Effectiveness

There is considerable hope that the delegation of funding to the school level will improve not only the effectiveness of the spending of education dollars, but also the effectiveness of the entire education systems implementing these programmes. As mentioned at the beginning of this chapter, the context for the development and implementation of school-based funding is a focus on dramatically improving school achievement results. The strategies in this area being deployed by all four USA districts are part of a broader strategy of identifying whole-school high-performance designs – one of which is to be selected by each site. Further, the design itself, which addresses the curriculum and instruction programme, classroom and

school organization, and school staffing and resourcing, is what the devolved funds are intended to finance. The hope is that all of the school site's resources will first be allocated to the needs of the chosen design, and that over a three- to five-year period, each school will restructure itself into its selected design.

Because of the specific focus of linking decentralization to the selection of a high-performance school design, and because there is increasing evidence that these designs improve student achievement (Fashola and Slavin, 1997), the school-based financing plans in the four USA districts should be expected to precipitate a rising level of student achievement. Clear answers in this area will only emerge with time and after some careful research.

Although the Edmonton programme is not linked explicitly to school designs, the district has adopted education standards during the past few years and is now more explicit in wanting schools to deploy control over their budget and programmes, with strategies more explicitly designed to improve the performance of their students with respect to the new standards.

(f) Administration

In terms of administration and administrative efficiency and effectiveness, the four USA districts get mixed reviews. Edmonton is well administered and has already delegated the vast bulk of the budget. The four USA districts fall a little short of linking a decentralized budget to a hard analysis of what should be centrally administered and what should be site administered, and thus have retained several functions which, arguably, could and should be devolved.

At the same time, the use of the to provide a school-based information system through which the school-based financing system can be operated, represents an important advance in Seattle (http://sps.gspa.washington.edu/sps/) and Edmonton (http://www.epsb.edmonton.ab.ca). Indeed, a key to effective decentralization is creating an information system that provides the school – the new decision-making arena – with as much detailed information as the district had in the past. Indeed, the major reason decentralization can work in today's environment is that the computer allows organizations to distribute and provide information to everyone.

Conclusion

The five districts profiled in this chapter represent impressive North-American efforts to design and implement school-based financing systems. The systems are not only comprehensive and sophisticated, but are also linked to district strategic objectives to dramatically

improve student performance. The systems are not proffered as goals or objectives in themselves, but are part of broader education efforts to adopt high and rigorous content and performance standards, decentralize district operations to school sites, have schools select high performance designs as their vision for improvement, and have schools restructure themselves into those designs over three to five years, including reallocating their resources to the needs of those designs. Hence, these school-based financing programmes are strongly linked to educational strategies to produce higher levels of student achievement. Because of these inter-connections, the likelihood that adoption of these programmes will be accompanied by better efficiency, effectiveness, and productivity should be considered quite high.

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Chapter 10

Case Study 4: Formula funding of schools in New Zealand

Nicholas Pole

The origins of formula funding

In the 1990s, following the passing of the Education Act 1989, the New Zealand school system was decentralized within a national framework of guidelines and accountability. These reforms addressed a number of long-standing criticisms of the administration of schooling in New Zealand that had been identified in a government task force report entitled *Administering for excellence: effective administration in education* (Picot, 1988). The task force lodged five key criticisms: excessive centralization of decision-making, complexity with 'too many decision points', lack of information and choice, lack of effective management practices, and feelings of powerlessness.

A government White Paper, *Tomorrow's schools* (Lange, 1988), that was prepared in response to the Picot report, placed significant emphasis on the devolution of responsibility and management for education to local communities. This was operationalized when the Education Act 1989 established a management model within government schools where Boards of Trustees (consisting mainly of elected parents and the school principal) took responsibility for the control of their own educational resources, to be used as they determined within overall guidelines set down by the state.

The Boards of Trustees were guided in their decision-making through National Education Guidelines which, since 1993, included detailed information concerning education goals, national administration guidelines, and national curriculum frameworks. The National Education Guidelines gave priority to several goals: the highest standards of educational achievement; enhanced equality of opportunity; improvement of the capacity of New Zealanders to compete internationally; better levels of basic literacy and numeracy; expanded programmes in science and technology; excellence through the establishment of clear learning objectives; delivery of individual programmes to meet student needs; increased participation and

success by Maori[1]; and furtherance of respect for the diverse ethnic and cultural heritage of New Zealand people. The National Education Guidelines also covered issues related to responsibility for curriculum, personnel practice, financial and property management, health and safety legislation, and school enrolment policy. The centrepiece of this new approach to the delivery of education was the requirement that government schools should establish a 'charter' which represented an undertaking by each Board of Trustees to the Minister of Education with respect to the aims, purposes, and objectives for the school.

An Education Review Office was established in 1993 as an independent government department and was given the authority to monitor, evaluate, and report on the nature and quality of school education. This agency was also given a mandate to conduct periodic reviews of individual schools in order to report on the extent to which Boards of Trustees were behaving lawfully and were addressing their obligations and undertakings – especially those concerned with the quality of service delivery.

These far-reaching changes in the management and operation of the education sector coincided with a general programme of restructuring and reform within the state sector that was commenced by the Fourth Labour Government (Boston and Holland (ed.), 1990; Boston et al., 1991 and Easton, 1997). The reforms aimed at improving the efficiency and effectiveness of social service delivery, improving accountability, and increasing transparency in resource allocation and distribution. As a consequence, Boards of Trustees were resourced directly from the government through the Ministry of Education without other intermediary or regional agencies being involved in decision-making or resource management. Within the school sector this devolution of power was seen as placing decision-making where it would have maximum impact which, in turn, was expected to result in greater partnership among all stakeholders, improved school responsiveness to community needs, more accountability for outcomes at the school level, better opportunities for self-review and innovative practices, and improved teacher performance.

School budgets: centralized and delegated portions

The Board of Trustees for a school is responsible for overseeing the management of the school and its resources, including its budget. Within this structure the school principal, who is appointed

1. Maori are New Zealand's indigenous people, accounting for 14.5 percent of New Zealand's total population.

by the Board of Trustees, acts under delegated authority as its Chief Executive Officer and has responsibility for day-to-day school administration. Given this high level of devolution it was seen as important to ensure sound accountability and reporting procedures. All Boards of Trustees were therefore required to produce an annual report containing an audited statement of their financial accounts which are to be made available to the school community and to the Minister of Education. Financial statements based on these reports are also consolidated for all schools and reported to Parliament.

The initial intention of the reforms was for schools to be allocated lump-sum budgets for the purchase of most of their required inputs. To date this has only been partially successful, with schools receiving funding to cover their operational activities but responsibility for the direct payment of teachers' salaries in the majority of schools remaining with central government.

There has developed two approaches to the allocation of teachers' salaries: Centrally Resourced Schools (CRS) and Directly Resourced Schools (DRS)[2]. Most schools are centrally resourced with the teacher salaries component of a schools expenditure being paid directly by the Ministry of Education. However, a school may choose to be funded directly for the cost of their teachers. This DRS programme was introduced at the start of 1996. It followed on from a trial (the Teachers Salary Grant Scheme) introduced in 1992. The intention of direct resourcing has been to increase the total amount of resources devolved to the school level and thereby provide Boards of Trustees with greater flexibility in resourcing decisions (Edwards, 1993; Edwards, 1994 and Dixon and Edwards, 1995). Teacher salary funding in DRS schools was initially based on a calculated global average for all teaching positions established within a schools staffing entitlement. This, in part, restricted the entry of some schools into the programme as their existing salary profile was such that even with a premium built into the scheme, they were net losers in the short term. By the end of 1997 only 11 percent of schools were operating under the DRS programme. From the middle of 1998 the formula for the calculation of teacher salary funding was changed with funding calculated on the basis of the maximum step in the salary scale as opposed to the average. To date this has seen participants voluntarily entering the scheme increase to almost 30 percent of state schools, employing 37 percent of state school teachers.

The DRS programme has been vigorously opposed by teacher organizations, who see it as having the potential to remove national based collective bargaining for salary and conditions. This is even though Boards of Trustees are a teachers legal employer. These

2. From July 1998 the title for this funding programme has been changed to the 'Fully Funded Option'.

organizations are also concerned that successive governments will fail to maintain the purchasing power of the DRS grant, that there will be pressure for schools to increase class sizes, employ poorer quality and less experienced teachers and that there might be adverse public reactions against teachers if school bankruptcies occurred due to poor management of resources by Boards of Trustees. Many Boards of Trustees, as volunteers, have also been reluctant to take on the additional workload associated with these broader responsibilities, especially when this might lead to the need to negotiate teacher employment contracts.

The New Zealand school budget allocation is therefore divided into three distinct parts: core staffing of teachers and senior managers, major capital works, and operational funding. It is only the core staffing of teachers and senior managers in DRS schools and operational funding in all schools that come under the control of a school, and may be considered to be formula funding.

The design of the funding formula

Operational funding for all factors other than teachers and senior managers is not earmarked for any particular purpose (Ministry of Education, 1997), and it includes all four components of a funding formula that were mentioned in *Chapter 3*: basic student allocation, curriculum enhancement, student supplementary educational needs, and school site needs. Boards of Trustees have full discretion to set their spending priorities and manage the total operational grant as they believe necessary to achieve the objectives stated in their charter. The initial creation of this funding framework took into consideration actual costs, but also modelled cost structures in terms of the needs of groups of different sized 'typical schools'. There was an explicit intention within this framework not to resource differentially on the basis of regional location – however, variations in school size were recognized, along with certain school site circumstances such as energy usage.

While the basic structure of the funding formula has remained fairly stable since it was introduced at the start of the 1990 school year, a number of additional elements have been added and several have been amended. The addition of new elements to the formula has mostly resulted from government policy initiatives identifying new outputs for the sector (as in the case of career guidance funding or the special education grant), or as a consequence of the collapse and reconstitution of existing activities. There has also been a shift from entitlement and attached staffing positions funded directly by the government, to a distribution of this resource to schools on the basis of student-based funding.

In *Table 10.1* the components, dimensions, and indicators employed in the formula funding of schools in New Zealand have been summarized. This summary table follows the general structure outlined in *Chapter 3*. In the following discussion each of the four components of the New Zealand funding formula is presented in turn and those elements of teacher funding and operational funding which relate to each component are also examined.

(a) Component 1: Basic student allocation

(i) Core staffing and management

Each state school is provided with a guaranteed teacher entitlement based on roll size. This entitlement consists of a core staffing component and a management component. The core staffing entitlement is intended to address curriculum delivery within the school and is allocated on the basis of a teacher/student ratio at each grade level, as shown in *Table 10.2*.

An allocation for management staffing is calculated separately, and is designed to cover time for schools to manage the total curriculum process. This includes allowances for additional management time as the school roll increases, the provision of student guidance, the extra complexity of managing students with more diverse curriculum needs (especially in senior secondary schools), and the management of attached teachers. The management component generates time which rises steeply for schools with rolls of up to 200 and then levels out on a gradual basis (Ministry of Education, 1995). It is generated in such a way as to recognize the demands of educational delivery to students at different levels. The weighted roll factor is determined according to the ratios shown in *Table 10.3*.

The Management Component is calculated as follows:{(0.0003 × Weighted Roll Factor) + 0.017 × √(Weighted Roll Factor) + (0.05) × number of attached teachers}

While centrally resourced schools are entitled to staff up to the maximums specified through these formula, directly resourced schools receive funding to cover the costs of employing equivalent to the level of staffing and management established under the above formula. In both cases CRS & DRS schools may also choose to employ additional teachers to those provided for under entitlement, either from operations funding or from locally raised funds. Obviously the greater funding afforded DRS schools provides greater opportunities for these schools to alter their staffing inputs. Evidence to date is that this group of schools has tended to use the additional resources provided under this scheme to employ additional teachers and secondly that these schools have not tried to maximise their staffing levels through the employment of less experienced teachers.

Table 10.1. Relationships among Components, Dimensions, and Indicators in the development of a school funding formula for New Zealand

Components	Dimensions	Indicators
Component 1: Basic student allocation		
1(a) Basic allocation (staff)	1(a) Core staffing entitlement	1(a) Teacher/student ratio
1(b) Grade-level supplement	1(b) Enrolment differentiated by grade/ year level	1(b) Enrolment weighted – using 4 categories of grade-level weights (Y1-6, 7-8, 9-10, 11-15)
1(c) Basic allocation (funding)	1(c) Basic operational funding	1(c) Total student enrolment
1(d) Basic allocation (relief)	1(d) Relief teacher funding	1(d) Total number of teachers
Component 2: Curriculum enhancement		
	2(a) Technology curriculum in Manual training centres	2(a) Total enrolment in centres
	2(b) Transition education programmes	2(b) Total FTE (if Technology School)
	2(c) Maori language programmes	2(c) Total Maori enrolment
	2(d) Special school	2(d) Total enrolment of special students
Component 3: Student supplementary educational needs		
	3(a) Socio-economic status	3(a) Indicator of socio-economic disadvantage
	3(b) Special school curriculum	3(b) Total enrolment weighted by disadvantage
	3(c) Career guidance	3(c) Fixed amount to schools with senior secondary enrolments – weighted by disadvantage
Component 4: School site needs		
	4(a) School size (small school adjustment)	4(a) Total enrolment < 390 students
	4(b) Location (in terms of isolation)	4(b) More than 30 km to town of 2,000 plus persons
	4(c) Site running costs (services)	4(c) Historical amounts
	4(d) Site running costs (clean, heat, maintain)	4(d) Interior area of school/grounds in m^2
	4(e) Site running costs (insurance, vandals)	4(e) Total enrolment'

Note: Y1 is equal to the first year of schooling. Students progress through school on the basis of social promotion.

Table 10.2. Staffing levels for state schools

Year of schooling	Teacher/student ratio	Implicit staffing weights
Year 1-3	1:23	1.0
Year 4-6	1:29	0.79
Year 7-8	1:29	0.79
Year 9-10	1:25	0.92
Year 11	1:23	1.0
Year 12	1:18	1.28
Year 13	1:17	1.35

Table 10.3. Weighting factor used in calculating school management time allowance

Year level	Weighting Roll Factor
Year 1-3	Roll × 4.0
Year 4-6	Roll × 3.5
Year 7-8	Roll × 3.5
Manual training	Roll × 0.5
Year 9-10	Roll × 7.0
Year 11	Roll × 9.0
Year 12	Roll × 15.0
Year 13	Roll × 16.0

(ii) Operational funding

The allocation for operational funding for all factors other than teachers and senior managers is largely driven by student roll numbers. Per-student funding rates are set at four levels and they attempt to recognize the cost (excluding teacher salaries) of educating students at a particular level. Students in their first six years of schooling are funded at the lowest level and funding rates increase with the age of students, so that senior-school students are essentially funded by approximately 50 percent more than beginning students (see *Table 10.4*). This situation reflects the generally higher equipment, assessment, and resource needs of older students.

In any year an initial level of funding entitlement is delivered to the school on the basis of a predicted roll supplied to the Ministry of Education by the Board of Trustees and Principal in the previous year. In secondary schools this is replaced by an actual roll in March (considered as an estimate of the school's peak roll), which becomes

Table 10.4. Per-student funding levels for operational costs

Year level	Increase in per-student funding over rates set at Y1-Y6 (1997)
Y1-Y6	1.00
Y7-Y8	1.15
Y9-Y10	1.34
Y11-Y15	1.49

the basis of the school's funding for the entire year. For primary schools a wash-up based on an estimated end-of-year roll (the peak period for primary schools) is determined following the collection of actual rolls as at July. Enrolments within these counts reflect formal enrolments at the school rather than attendance. Within the senior school, roll counts are funded on the basis of full-time-equivalent students rather than pure head counts.

(iii) Relief teacher funding

In addition to a basic operational grant, schools receive an allocation for relief teaching. The creation of a funding regime to meet the costs of relief teachers in the case of teacher absence has proved difficult. The current scheme has attempted to create a formula for this resource while maintaining an element of discretion. Boards of Trustees are currently funded directly to cover the cost of employing relief teachers to substitute for teachers on sick leave. In addition, a central pool is managed by the Ministry to reimburse schools for relief costs in unusual or emergency circumstances which would potentially expose the school to excessive demands on their funding. This includes legitimate absence by an individual teacher resulting from a long-term or recurring illness. Relief-teacher funding is delivered on a teacher-entitlement basis and rates are differentiated between sector and the size of the management component allocated to each school (with schools that have teaching principals receiving a higher funding level for employing relief teachers).

(b) Component 2: Curriculum enhancement

(i) Technology curriculum in manual training centres

At year 7 and 8, additional staffing is provided to schools that operate manual training centres to support the delivery of technology programmes. These special centres use expensive equipment which needs to be constantly maintained and updated, and they use a great deal of consumable teaching materials as part of practical training sessions.

(ii) Transition education programmes

Funding for school-to-work transition education programmes is built into the per-student funding components at a rate of $17.19 for Y9-Y10 and $19.06 for Y11-Y15. This funding is considered to cover administrative staffing, operations, and travel for education associated with school-to-work initiatives. Additional funding for specific 'non-conventional' senior-school programmes that are delivered either by the school or through the school purchasing programmes from an external provider, is also available on the basis of an annual application to a capped pool (presently around of $18.7 million). This additional resource is aimed at covering the differential between the teaching and operations resources delivered to the school for senior students and the cost of purchasing a course for a student at a tertiary institution or for the school to run a specialist course in a non-conventional subject area.

(iii) Maori language provision

Additional teaching positions may also be included in a school's staffing entitlement, depending on the existence of Maori language programmes. The implementation of these activities is subject to requests made by a school's Maori community.

(iv) Special school curriculum

Two additional levels for operating grants (which are essentially averages of the regular school rates) are set for junior and senior students in special schools. That is, provision is made to provide supplementary funds for special schools outside the widespread integration programmes.

(c) Component 3: Student supplementary educational needs

There are three student-specific dimensions within the third component. The first is targeted towards students from socio-economically disadvantaged backgrounds and seeks to improve educational outcomes for these students. This programme is known as Targeted Funding for Educational Achievement (TFEA). The other two dimensions make provision for integrated special students and the career guidance needs of senior secondary-school students.

(i) Student socio-economic status

Targeted Funding for Educational Achievement provides additional per-student funding to schools catering for students drawn from

socio-economically disadvantaged communities. This programme developed from an amalgamation of a range of resources which had been provided, on a somewhat ad hoc case-by-case basis, in order to improve the learning outcomes of students from poor homes. Resources were often distributed on a 'best-case-made' basis rather than on demonstrated need, and this 'bidding' approach to funding resulted in added burdens for schools serving disadvantaged areas because of the requirement to develop formal applications for additional resources that had only a limited guarantee of success. As a result of this approach, a number of schools in New Zealand's poorest communities failed to receive any supplementary assistance because they did not recognize their own need, or because of fear of the stigma associated with the receipt of such resources, or due to frustration at the complexity of the processes required to secure additional funding. Other factors also contributed towards this rather chaotic approach to assisting disadvantaged students. For example, traditional rivalries between regions of the country often raised pressure to ensure equity across regions – without recognition that some regions were much more disadvantaged than others. Resources also often tended to become diluted as subjective approaches to assessing applications across a range of needs resulted in the general trend of ever-increasing numbers of schools being included in these programmes.

The new approach adopted for the allocation of these resources developed out of research carried out for the Ministry of Education in the early 1990s (Dialogue Consultants Ltd., 1990, 1991) and was conceptually supported by a range of local and international research which had consistently identified a linkage between student socio-economic background and educational outcomes (Lauder and Hughes, 1990a and 1990b; Nash, Harker and Charters, 1990a, 1990b). The approach adopted was based directly on social indicators research undertaken by Ross in Australia for the Disadvantaged Schools Programme (Ross, 1983). This research demonstrated how to develop validated indicators of socio-economic disadvantage for Australian schools by linking school catchment areas with the data collection districts used by the Australian Census Bureau (Ross, Farish and Plunkett, 1988).

As a result TFEA is now allocated on the basis of a composite indicator of the relative socio-economic disadvantage of the communities from which each school in New Zealand draws its students. The indicator is constructed from six variables – five of which are derived from the Population Census data and one, the ethnicity variable, from school enrolment returns. The components selected for the indicator were originally identified from research that investigated correlational relationships between various indicators of disadvantage and school mean scores on national examinations. The best indicator had a correlation of around 0.85 with examination scores.

The use of this composite indicator received wide community support because it allowed for a broader view of educational disadvantage – rather than being merely limited to factors such as parental income or parental occupation. The latter of these two had often been used as a criterion, with mixed results, for testing eligibility for small amounts of supplementary equity resources prior to 1994. One important feature of the composite indicator was that it included an ethnicity factor in recognition of barriers to learning over and above those of socio-economic status that had been identified for Maori and Pacific Islands students (Dialogue Consultants Ltd.,1990). Subsequent research has reinforced the power of this indicator as a powerful explanatory factor of educational performance (Flockton and Crooks, 1996), and has also confirmed the relatively high level of association of the indicator with nutrition, learning, and health problems (Garden,1996a; Garden, 1996b).

The variables within the indicator provide an assessment of household income, the concentration of the workforce in manual and unskilled occupations, household crowding, lack of educational qualifications among parents, welfare benefit dependency, and the proportion of school rolls constituted by Maori and Pacific Islands students. The first five variables were derived from Population Census data. The selection of census-based information, as opposed to school survey data, was made because the data did not require the collection of sensitive personal information from individual students or their families. In addition, it was much easier (and cheaper) to develop in comparison with a school survey data collection because it simply required school catchments to be linked with the data collection districts used in the Population Census. Additional benefits arose from the use of census data because there was widespread community confidence that the information used to construct the composite indicator could not be manipulated unfairly, as might have been a possibility with a school data collection.

The construction of this indicator commenced by linking school catchment areas to census data collection districts (called 'meshblocks' in New Zealand). Meshblocks are relatively small areas used to implement the fieldwork for the Population Census and generally consist of around 50 households. This is the lowest unit of analysis for public access to census data in New Zealand, and it was found that over 60 percent of New Zealand schools drew their students from between 11 and 60 meshblocks. The process of linking school catchment areas to meshblocks was undertaken very easily and quickly in urban areas by using established Geographical Information Systems. In the case of rural schools, where student home-address information do not provide an exact specification of the location of students' homes, schools are provided with maps on which to physically mark the home locations of their students.

When these linkages were completed, it was possible to re-express the data contained within the census data archive using schools (and not meshblocks) as the units of analysis. That is, all of the data available in the census were accessible for constructing comprehensive social profiles of the communities served by New Zealand schools.

In order to cross-check the validity of the indicator it was subjected to two forms of analysis. First it was shown that the indicator was very highly correlated with mean school achievement scores. Second, school indicator scores were used to classify schools into deciles and the average values of the variables used to construct the indicator were calculated for each decile. This information provided an average social profile for schools within each decile group. The results of this analysis are presented in *Table 10.5*.

Table 10.5. Social profile of school catchment areas for four deciles on the socio-economic indicator

Variable (%)	Decile group means			
	1st	4th	7th	10th
Households in lowest income category	26	19	16	9
Average number of persons per bedroom	1.5	1.3	1.2	1.2
Parents not completed primary school	53	36	29	17
Parents on welfare benefits	42	24	14	7
Parents in manual occupations	29	19	13	7
Enrolment of Maori/Pacific Islanders	84	30	14	5
Parents unemployed	47	29	20	17

It may be seen from the first entry in *Table 10.5* that 26 percent of the households in the catchment areas of schools in the 1st decile on the indicator were in the lowest income category. Whereas only 9 percent of these low-income households were associated with the 10th decile. This general pattern across deciles for all variables indicated that low scores on the indicator were identified with schools that had catchment areas where many people were in the lowest income category, housing was relatively crowded, many parents had not completed primary school and/or were on welfare benefits, and the workforce was unskilled and/or unemployed. The lower scoring schools also served communities where many people were Maori or Pacific Islanders. Parents in these schools were also considerably more likely than other parents to have commenced their childbearing while teenagers. For schools at the 10th decile the reverse situation applied – with much fewer people in school catchment areas being socio-economically disadvantaged with respect to education, occupation, housing, etc.

The per-student funding supplements applied to address socio-economic disadvantage are allocated according to the system outlined in *Table 10.6.* Three separate funding sub-categories are employed within each of the first four decile groups – giving a total of 18 funding supplements ranging from 63 percent for the most disadvantaged (group 1(i)) down to zero for the most advantaged (group 10). When this indicator was initially developed, it was planned that the zero funding level would be implemented for decile groups 5 and higher. However, over time, funding allocations have been progressively extended out to decile group 9 – this has tended to 'dilute' the original plan of concentrating resources only on the most disadvantaged schools, but has addressed the boundary problems which frequently occur with any rigid cut off in resources. Since first developed the socio-economic profiles have been employed as a key mechanism for targeting a range of resource and educational initiatives to those schools catering for the most disadvantaged populations in New Zealand.

Table 10.6. Per-student funding supplements to address socio-economic disadvantage

Indicator decile group	Sub-category	Funding supplement (percent)
1	(i)	63
	(ii)	56
	(iii)	48
2	(i)	42
	(ii)	35
	(iii)	30
3	(i)	25
	(ii)	20
	(iii)	17
4	(i)	14
	(ii)	12
	(iii)	11
5		10
6		8
7		6
8		4
9		2
10		0

(ii) Special education

Provision is also made for special schools that serve poor communities by using a sliding scale of extra funding that is linked to the indicator of 'socio-economic disadvantage' described above. For example, special schools with indicator scores in group 1(i), the most disadvantaged group, receive an extra $34.50 per student. Higher groups receive progressively less until schools in group 10, the most advantaged group, receive $5 per student.

Students with long standing special education needs are also provided with supplementary resources through a scheme known as the Ongoing Resourcing Scheme (ORS). This programme ensures students with disabilities resourcing through their school careers sufficient to provide additional teaching and learning support and support required to participate in both special or mainstream schools. ORS resourcing is targeted to around one percent of students, assessed by independent verifiers on the basis of their learning support needs rather than category of disability. This group of students is further classified into categories of high and very high need, with funding for these students approximately four to five times the amount of a regular student. Resourcing for these students is managed by a fund-holder that purchases education services on behalf of these students.

(iii) Career guidance

At the upper end of secondary schools, the government has decided to make extra resources available for career guidance. It was discovered that the greatest need for this assistance was in the most disadvantaged schools – mainly because more students in these schools were leaving school early and at greater risk of unemployment. As a consequence supplementary resources in this area have been linked to a school's scores on the indicator of socio-economic disadvantage.

(d) Component 4: School site needs

(i) School site

Additional core staffing is allocated to small schools (with rolls of less than 160 students) by applying a maximum average class size at Years 1 to Years 8. This is to ensure that no class need have a teacher/student ratio greater than one teacher to 28 students. In addition to a staffing supplement, small schools also benefit from supplementary 'base funding' – which is a lump sum paid to each

school on the basis of a roll range that is designed to offset the 'diseconomies of scale' for small and very small schools. New Zealand has many small schools and it is only the existence of this form of assistance that has guaranteed the delivery of education in isolated areas. When originally established, base funding also contained a negative funding structure for very large schools, which was intended to compensate for the relative advantage experienced by large schools due to the application of average per-student funding rates.

(ii) School location

Supplementary resources are also allocated to isolated rural schools through the addition of 'Targeted Rural Funding'. This attempts to recognize the additional cost demands that have been placed on these schools. These schools may be disadvantaged because of added costs incurred in the delivery of goods and services, higher transportation costs for staff in professional development programmes, and greater expenses for students to participate in school-related activities outside their community (for example, inter-school sports and town- or city-based activities). The extra resources allocated to these schools aims to encourage the use of new technologies (for example, computer technologies and Internet services) as tools for overcoming isolation either through sharing the development of curriculum resources across schools in similar situations, or for accessing resources which may be more accessible in town or city schools.

Targeted Rural Funding reflects the 1996 collapse of three programmes previously applied within the funding framework: remoteness grants, special grants for small schools, and a discretionary resource which supported isolated schools for innovative approaches to curriculum delivery. In establishing entitlement to this resource, no attempt has been made to differentiate levels of isolation, rather, entitlement is based on a single set of criteria and reflects New Zealand's geography as two relatively narrow islands in which there are few differences in degrees of isolation. Entitlement to this funding includes being 30 kilometres' distance from a trade and service centre, with a population of 2,000 or more, and an absence of other schools within close proximity offering education to students at the same level. Determination of these criteria was derived from analysis of the type of services schools would typically call upon from a service centre, and the availability of these services in towns of various sizes. The size of population areas is derived from five-yearly census results and the distance between these centres and schools is mapped through geocoding. Failure to receive

this resource, because of close proximity to another school delivering education at the same level, has been specifically brought in as an incentive to motivate small schools in such areas to look at pooling their resources and to operate as a single entity in order to become more efficient and to improve the range of programmes that can be delivered to their students.

Targeted rural funding is presently delivered as a base funding component (around 30 percent over and above the base funding rate for schools in the smallest roll range) and as a flat per-student component (17 percent over and above the per-student rate received by primary-school students).

(iii) Site running costs (three categories)

The services (heat, light, and water), maintenance, and minor capital works contained in the operations grant are each calculated on the basis of specific school characteristics. Heat, light and water funding attempts to reflect factors specific to the circumstance of each school (for example, climate, type of construction, layout of the school, heating plant, and fuel used). The rating scheme used to assess these elements is largely historical.

Maintenance and minor capital works funding are both determined on the basis of the physical floor space of each school. This funding is provided to support property maintenance that is expected to occur within a ten-year cycle. Within this the minor capital works element is designed to enable Trustee Boards to undertake small capital improvements. Major property upgrades and the establishment of new classrooms remain the central responsibility of the Ministry of Education.

The establishment of two separate grants on the basis of property size has occurred as a signalling device in order to ensure Boards of Trustees are aware of their responsibilities in these areas and that these factors are explicitly funded by the government. It remains the responsibility of individual Trustee Boards to decide how they wish to deploy these resources. The selection of property area, rather than roll size, as the basis for funding reflects the government's interest in the maintenance of school facilities which may be substantially greater than those currently required by the school in terms of its roll size. This situation is, however, also perceived as supporting inefficient schools and working against the government's amalgamation agenda and its ongoing programme of property disposal. A recent change in this area has been to allow schools a 50 percent share of the returns from the sale of surplus school accommodation or land.

Vandalism funding is delivered on the basis of one of five risk categories (low, medium, high, critical, and extreme) assessed from a three-year inflation-adjusted average cost for each school. It is then distributed on a per-student basis. Rates range from $2.54 for low to $20.29 for extreme. In addition to vandalism, school contents' insurance is funded at $12 per student per annum. The isolation of these resources from per-student funding was designed as a signalling device to encourage schools to insure their assets (with the exception of land and buildings which are owned and covered by the government). School contents insurance is deducted from funding to schools who choose to use a risk management scheme operated by the Ministry of Education.

Evaluation

Efficiency and integrity in relation to student count

While the student count for a school proves relatively easy to audit, and has operated effectively for many years, it is currently open to challenge in a number of areas. In secondary schools, because a peak roll is chosen, there exist relatively few incentives for schools to retain students following the provision of their March roll return. As a consequence it is perceived that there is little motivation for schools to pursue students who may truant or who choose to drop out of school during the year. There are also no financial sanctions for schools who choose to indefinitely suspend students and no requirement for the funding to follow suspended students when they re-enrol at a neighbouring school. While March is considered a peak roll for secondary schools, rolls may continue to grow in some schools as a result of student mobility, and in some primary schools the mid-year census date may unfairly reflect enrolment patterns in the second half of the year. Alternative options to the current funding base are to calculate funding on the basis of weekly attendance or average weekly or monthly roll. These options are likely to be investigated in the near future.

Property maintenance

A major dilemma remains with respect to property maintenance. Given that this resource is not necessarily tagged to property maintenance activity, schools may choose to spend this resource on other activities, rather than to make provision for medium-term maintenance requirements, thus potentially running down facilities in order to meet shorter-term priorities. Research is presently under way into the extent to which provision for property maintenance is being made by

Boards of Trustees and the nature of individual property maintenance programmes.

Locally raised funds

In addition to government funding, schools may also raise revenue from other sources. These sources typically include charging fees for foreign students, trading activities, or through fund raising. Since the recent introduction of school funding reforms the level of local funds generated within the sector has increased substantially and now accounts for around 8 percent of income in primary schools and 13 percent of income in secondary schools.

Purchasing power

A weakness within the current funding regime is the lack of any mechanism to maintain the purchasing power of funding that is delivered to schools. To date, increases in funding rates have only occurred through specific, one-off, government budget initiatives. Such adjustments have often occurred as a result of either political pressure from school groups or on the basis of information presented in schools' financial statements, which indicate increasing numbers of schools moving into a deficit position. In a number of cases these increases in funding have typically occurred as a result of identifying an additional activity within the school sector[3], rather than as an across-the-board rate adjustment, although in effect the same outcome is achieved – an improvement in the level of funding delivered to schools.

This concern regarding the maintenance of funding levels will become particularly pronounced if a significant number of schools moves into the DRS scheme and responsibility for the negotiation of individual teachers' salaries is transferred to individual boards. While indexing funding on the basis of a price index would prove technically easy, such an approach is seen as potentially limiting the flexibility available to government in responding to changing fiscal imperatives and may not necessarily take account of the adequacy of the funding delivered.

Unintended incentives

Concerns have surrounded the base funding component that assists small schools to address diseconomies of small scale. A central

3. For example the 1995 Budget delivered additional funding to schools in order to support the implementation of technology and the National Qualifications Framework within the senior school.

issue has been that base funding has essentially operated as a disincentive to school amalgamation in locations where a number of very small schools exist in close proximity. In addition, the application of negative base funding in larger schools was viewed as a disincentive to these schools continuing to grow, particularly in areas experiencing significant demographic pressure. Subsequent revisions to the funding regime have both removed negative base funding in large schools and reduced, or allowed to decay, relative per-student funding rates, the base funding attracted by small schools.

Conclusion

In evaluating the initial trial of formula funding in New Zealand, Dixon and Edwards (1995) identified the role of management in the school as being crucial to realizing the short-term gains and flexibility presented by the scheme. These skills included being able to manage resources across a school over an extended period of time, and therefore warnings have been raised about the need for government to provide a safety net within such programmes for small and socially disadvantaged schools, and also schools subject to large roll fluctuations.

Alternative approaches to resourcing the sector based on the purchase of specific outputs or activity-based funding have recently been explored (Wilson, Houghton and Lorgelly, 1997). Such approaches would attempt to set a price for the delivery of particular services rather than, as at present, fund on an inputs basis. A major limitation to progressing in this direction is the difficulty associated with disentangling particular activities (for example teaching and pastoral care) and the limitations within schools' financial and operational information systems (for example, costing a teachers' time across a range of year levels or between teaching and administrative activities). This research has pointed to the potential compliance costs associated with structuring funding against specific activities.

In the immediate future, major areas of reform within the operations funding framework may include the collapse or aggregation of a range of components into single per-student funding rates, differentiated by year level and potentially socio-economic decile. As has been demonstrated in this review, there has been a proliferation of additional components added to the funding framework which has become somewhat unwieldy and many of these components deliver only a very small level of the overall resource to the sector. A number of components currently resourced on the basis of criteria other than student roll (as in the maintenance, minor capital works, and vandalism components) may also be brought into a student-based component. An additional area which may potentially be collapsed into a

per-student rate is the funding variously delivered for a range of senior secondary school activities.

A major dilemma for policy-makers will be the reconciliation of the present divide between resourcing the sector for teachers/staff and other operational activities. Continued support for the DRS scheme will obviously rely on the extent to which schools opt into the scheme and a critical mass can be achieved. This split between funding categories has caused the implementation of a funding formula to be more complicated than originally envisaged. However, it must also be acknowledged that a notable feature of the New Zealand approach to the formula funding of schools has been the extent to which it has been able to rapidly respond and adapt to emerging issues and demand – and there is every expectation that this situation will continue as the Ministry and individual schools gather more experience with this innovative and challenging approach to school finance.

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Chapter 11

Conclusion

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This book has explored the conceptual, methodological, and empirical issues concerned with the use of formula funding of schools as a mechanism for achieving needs-based resource allocation in education across whole school systems. The main focus of this discussion has been placed on approaches to formula funding that deliver resources directly to schools from a funding agency. A 'funding agency' in this context could be a central or state government, or an education authority that may operate at regional, district, or local levels. The various formula funding approaches that have been used in some education systems to allocate resources among different levels of educational administration which operate above the school level have not been considered.

The notion of 'formula funding' has been interpreted in the book as referring to the application of an agreed set of explicit rules that are applied systematically and impartially in order to allocate resources among schools. This view of resource allocation in education challenges alternative, and widely applied, procedures that are often based on historical precedent (in which the main benchmark for future spending is based on what has happened in previous years), bidding (in which schools seek to argue their own individual cases for particular funding levels), and discretion (in which resources are allocated according to the personal judgements, and sometimes whims, exercised by funding agency administrators).

In each chapter the term 'needs-based' has been applied to funding arrangements that seek to ensure that the resources allocated to each school are derived directly from a systematic analysis of what each school needs in order to provide a specified quality of education for students. A successful application of this approach to resource allocation among schools demands a prior specification of the kind of educational provision that schools are required to provide for students with particular characteristics, and an associated justification for why different forms of provision result in differential costs. In this sense, needs-based funding aims at establishing a well-reasoned link between the resource levels allocated to schools and the characteristics of students, programmes of learning in schools, and school sites. Except in the very unlikely circumstance that there are no differences across a school system with respect to

these characteristics, the needs-based approach to resource allocation implies a substantial movement away from simple per-capita funding.

The case studies selected for the book have concentrated on school systems in Australia, Canada, England and Wales, New Zealand, and the United States that have implemented various school-based management models that aim to place the bulk of a school system's available educational resources under the control of schools. These school systems were selected because most of the new breakthroughs and improvements related to the conceptual and methodological features of formula funding have occurred in association with movements towards the radical decentralization of school systems. The implementation of these kinds of school-based management models has generated tremendous pressures on school systems to seek out and deploy the very best approaches to formula funding. This has occurred because these models depend for their integrity on fair, defensible, and research-based resource allocation procedures that are applied in an impartial, transparent, and systematic fashion to all schools within a school system.

It should be noted that less sophisticated formula funding approaches have quite a long history within more traditional school systems, where they have often been used to make various 'in kind' resource entitlement decisions. This approach offers schools 'units of account' (rather than real money) which they can subsequently 'spend' on a range of alternatives such as extra staff. The result is that schools have more scope for applying local choice – which tends to enhance efficiency without risking the problems of poor financial management skills or dishonesty that may arise with the management of money-bearing accounts. The most common expression of this approach has been the use of formulae derived from student/teacher ratios to guide the determination of school staffing establishments.

The main message that arises from the book is that needs-based resource allocation in education via formula funding of schools offers considerable benefits to all types of school systems in terms of increased levels of equity, efficiency, effectiveness, transparency, and accountability. While these benefits can be obtained from formula funding irrespective of whether school systems have centralized or decentralized management structures, it is important to point out that the type of administrative system under which schools function will in part determine how the formula is constructed in order to provide the kinds of policy outcomes that decision-makers require.

Towards implementation of formula funding: a checklist for school systems

The discussion of needs-based formula funding that has been presented in this book has covered three main areas: the policy

260

context and underlying principles involved in needs-based formula funding, technical issues related to building funding formulae based on four components of educational need, and case studies of needs-based formula funding in five countries. The case studies illustrated that, while the same general principles for the construction of formulae were being applied across countries, there were differences in the selection and measurement of indicators for formula construction (often due to data availability and value judgements about the salience of various aspects of educational need), and differences in the degree of operational control over allocated resources (often due to different nuances associated with policy objectives and styles of educational management).

There are a number of important lessons that can be drawn from a detailed analysis of the case studies as presented in this book and a further probing of the circumstances surrounding the successful implementation of formula funding in these countries. The most important of these are concerned with six factors that determine whether or not there are favourable conditions for needs-based formula funding to be implemented as a major step away from established resource allocation mechanisms. In the following discussion these factors have been presented with the aim of providing a brief 'checklist' for senior decision-makers in school systems that may be contemplating the implementation of needs-based formula funding. It should be emphasized that the six factors are highly inter-connected and therefore failure on any one of them could interfere with success on all others – which would thereby prevent, or certainly inhibit, the introduction of new resource allocation arrangements.

Each of the factors is relevant to the application of needs-based formula funding in both centralized or decentralized school systems. The main differences in approach here would be that, as mentioned above, the nature of the resources in a centralized school system could be in the form of 'in kind' resource entitlements, while the resources in a fully decentralized school system could be monetary. In some school systems it would be possible to consider a mixture of approaches with, for example, staffing being allocated on an 'in kind' basis, and costs related to all other school operations being addressed by allocating cash directly to schools.

(a) Clear and agreed policy environment

Needs-based formula funding requires a clear educational policy environment that features explicit objectives which are intelligible, prioritized, and widely accepted. This kind of environment makes the task of formula construction much easier because it provides formula designers with guidance about the selection of formulae

components, dimensions, and indicators. It also helps to identify those aspects of funding formulae that should be given more weight so as to make them more congruent with stated policy priorities. Clarity and agreement on policy matters are also necessary for making the initial decisions that form the framework for formula funding. This is especially the case with respect to (a) decisions related to the proportion of the total education budget that is to be allocated by formula, and (b) decisions that guide the relative proportions of resources that are to be assigned to each of the four major funding components.

(b) Adequate technical infrastructure

A comprehensive and accurate information base is required for formula construction that will allow indicators to be developed which reflect the various underlying dimensions of the formula. In particular there is a need for accurate information on (a) school enrolments by grade level (Component 1 of the formula); (b) enrolments in schools or programmes that feature specialized curricula (Component 2 of the formula); (c) important student characteristics such as socio-economic background, language fluency, and educational achievement (Component 3 of the formula); and (d) school site issues such as school size, location, and site running costs (Component 4 of the formula). Information is also needed to assist with making decisions about the magnitude of the coefficients for the indicators because these control the financial differentials for different measures on each indicator. A sound information base permits various formulae to be modelled and compared prior to implementation, and this is essential for ensuring a smooth transition between established funding procedures and formula funding.

The development of an appropriate information base presupposes that suitably trained technical staff, and adequate computer hardware and software are available. The hardware and software requirements do not present major problems in this era of inexpensive and powerful micro-computing. However, the availability of skilled staff on a long-term basis can prove to be problematic for some school systems. These technical staff are required not only to build the information base, but also to maintain it, and to adapt formulae to address changing policy circumstances and new knowledge about resourcing issues – such as the impact of supplementary-needs funding on educational outcomes.

(c) Transparency and open dialogue

All stakeholders involved in a school system that adopts needs-based formula funding approaches must be open and tolerant with

respect to accepting public scrutiny of data on schools. Free access to data gives stakeholders confidence in the fairness and impartiality of the process and it also places great pressure on data providers to deliver accurate information. In order to optimize open dialogue there needs to be an ongoing forum that involves continuous participation by policy-makers, central and regional administrators, local political leaders, school principals, teachers, teacher organization representatives, and members of school councils. This kind of forum is necessary for providing formula designers with appropriate information (of both a factual and judgemental nature) regarding the impact of various formula-construction decisions.

The dialogue generated by the forum needs to be managed and channelled so as to prevent gridlock caused by the objections of entrenched interest groups that may not accept the outcomes of rational decisions about formula construction. In addition, the formula designers need to be sensitive to the information needs (and political positions) of all stakeholders, so that technical issues are carefully and patiently explained and justified without precipitating the deep mistrust that always flows from a 'black box' style of formula construction.

(d) Willingness to accept change

The implementation of needs-based formula funding inevitably results in a break with past resource allocation patterns. Such changes in financial allocations are often gleefully portrayed by the media and pressure groups as 'winners and losers' contests. A willingness to change therefore needs to be generated among stakeholders well in advance of the commencement of formula construction so that decisions can be taken in the interests of the whole school system. One avenue for ensuring willingness to change is to establish a clear plan for transition arrangements that will cushion the impact on those schools that may suffer a major loss of resources. For example, it may be possible to introduce formula funding at the same time as the total budget for schools is increased – so as to ease the pain of transition for 'losing' schools.

Another approach to fostering a willingness to change is to have the stakeholder representatives commence work on needs-based formula funding by reaching agreement on the specific aims and objectives of the new funding system before commencing any discussion about the construction of an operational formula. The agreed aims and objectives can then be used as broad decision-making guidelines that may be applied if sectional conflict occurs due to resource distribution impacts on particular schools.

(e) Resources for implementation and maintenance

The setting-up costs for needs-based formula funding are much higher than the maintenance costs. However, the matter of maintenance should never be taken lightly because this forms an essential element in building trust in the formula funding process. All funding formulae require constant updating to reflect changes in the values of indicators for individual schools and to make appropriate adjustments to coefficients as new knowledge becomes available.

A balance needs to be struck between the temptation to construct funding formulae that are extremely sophisticated, and the need to have realistic requirements for data collection and analysis. This is especially the case in the area of indicators related to the student-specific and school-specific components, because excessive levels of detail in these areas can rapidly raise data collection costs and also increase reporting burdens for individual schools. Too much detail in indicator construction can also result in breaches of confidentiality and/or give rise to incentives to manipulate sensitive data that are difficult to validate. This is especially the case when information is being gathered about the home circumstances of the families of individual students – such as income, employment, marital status, ethnicity, and social welfare benefits.

(f) Research support

There are three main areas that require research support – and it is important to recognize that the results of this research are often specific to particular school systems and cannot always be inferred across national borders.

(i) *Applied research* is needed to establish activity-led costing procedures at the per-student level for different grade levels and educational programmes. This information is essential for calculating realistic coefficients to be used for generating costs related to the first component (Basic Student Allocations) of a funding formula. In addition, applied research is needed to identify and test the best indicators of supplementary educational need and the coefficients that are to be attached to them.

(ii) *Educational policy research* is needed to examine the relationships between educational policy objectives, funding formula design, and the impact of formula-related incentives on decision-makers in schools. This is actually a monitoring exercise which tracks the impact of (often unexpected) incentives associated with the results of applying a particular funding formula. Research in this area is also needed on: the match between

expert views on effective resource usage and actual patterns of resource usage; issues associated with mixtures of private and public funding flows to schools; and the development of new funding formulae that have learning outcomes as a focal point.

(iii) *Basic research* into the links between resource usage and learning outcomes is needed at school level in order to inform overall resource-allocation decisions at the national level. Sound research knowledge in this area enhances effectiveness and efficiency throughout the whole school system. Some important examples in this domain are research on: the impact of class size and the learning progress of young and disadvantaged children; the value of teacher support assistants; and the long-term impact of early literacy interventions.

A concluding comment

Needs-based resource allocation in education via formula funding of schools is an important and expanding trend that is beginning to influence the resource-allocation strategies of many school systems. The authors of this book believe that there are many benefits involved in the introduction of this approach to the financing of schools, and that these benefits can be obtained independently of the degree of centralization or decentralization of educational management procedures.

The direct benefits of needs-based formula funding have been extensively illustrated throughout the book. However, in closing, it is worthwhile pointing out that there are two key benefits to be derived from needs-based formula funding which should be characterized as 'indirect benefits' or 'side benefits' – in that they are not directly linked to issues of resource allocation within school systems. These two benefits emerge from the debates, reviews, analyses, and research that form a backdrop to the mechanical tasks of building funding formulae and distributing resources.

The first of these benefits is focussed on the manner in which needs-based resource allocation pushes whole communities, and sometimes whole nations, to re-visit and call into question the fundamental assumptions and premises upon which their school systems are based. This process of review and analysis is driven by the inherent transparency of funding formulae which are designed to represent operationalizations of the policy values (concerning equality, liberty, efficiency, and productivity) that form the basic framework for defining the aims and operations of education systems.

The second benefit is that the implementation of needs-based formula funding immediately centres attention on the linkages between resource usage and educational outcomes, and thereby opens

up a more productive debate on the best means for improving the effectiveness and productivity of school systems. Such a debate fosters a search for relevant knowledge that will shed light on important and enduring research questions concerned with the most cost-effective ways of dealing with specific educational needs. This process is particularly noticeable in those school systems where needs-based formula funding is accompanied by decentralized resource management (within a framework of professionally monitored standards) because practitioners at school level become encouraged to generate and make more effective use of locally specific knowledge about how to optimize learning outcomes for their own students.

This book was prepared with the aim of contributing to the improvement of the functioning of education systems by providing a comprehensive analysis of the policy contexts, technical issues, and case studies that are related to the application of needs-based resource allocation in education via formula funding of schools. The authors of the book offer their contributions in the hope that further debate will be forthcoming with respect to this significant trend in the financing of education.

266

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The book

This book explores a range of conceptual, methodological, and empirical issues concerned with the application of needs-based resource allocation in education via formula funding of schools. The notion of 'needs-based formula funding' employed in this discussion refers to the impartial application of an agreed set of explicit rules to allocate educational resources in a manner which ensures that schools receive what they need in order to deliver a pre-specified quality of education.

The book is presented in three main parts: the policy context for needs-based formula funding, technical matters related to the construction of funding formulae, and case studies in five countries. The conclusion offers a 'checklist' for senior decision-makers in Ministries of Education that highlights the pre-conditions for undertaking a successful implementation of needs-based formula funding.

The main message that arises from the book is that needs-based formula funding of schools offers considerable benefits to both centralized and decentralized school systems in terms of increased levels of equity, efficiency, effectiveness, transparency, and accountability.

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269